Depth-of-processing and trauma-induced memory bias in survivors of burn injuries

and Research Portfolio.

Submitted in part fulfilment of the degree of Doctorate in Clinical Psychology at the University of Glasgow.

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Contents

Chapter 1 Small Scale Service Related Project

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Do GPs change their referring behaviour towards Clinical Psychology services in response to the employment of Community Psychiatric Liaison Nurses?

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1.1 Do GPs change their referring behaviour towards Clinical Psychology services in response to the employment of Community Psychiatric Liaison Nurses?

Background: GPs currently manage 90-95% of individuals presenting with mental health problems but various studies have shown that they feel under prepared for this role. Reconfiguration of secondary services in response to the NHS modernisation agenda is beginning to provide relevant support. In a deprived area of the West of Scotland the Community Mental Health Team (CMHT) is piloting a CPN-Liaison service to provide training, consultation and therapeutic input for patients attending local GP practices.

Aims/Methods: This study considered the impact of this new service on referral rates to Clinical Psychology for two groups of practices receiving CPN-Liaison input (intervention groups) compared to a matched control group of practices.

Results: Contrary to predictions, Interrupted Time Series Analysis did not show significant reductions in referral rates for intervention groups associated with CPN-Liaison input. However, in accordance with predictions there was also no decrease in referral rates from the Control Group.

Conclusions: The results are discussed in terms of methodological issues, particularly potential Type II errors and implications for services are considered if a reduction is in fact present. Recommendations from the study are also discussed in relation to service evaluation in general and developments in CPN-Liaison services.

Keywords CPN Liaison, Clinical Psychology, Interrupted Time Series Analysis

1.2 Introduction

For those who seek treatment for mental health problems 90 - 95% will be seen entirely within primary care settings (Espie & White 1986, Goldberg & Huxley 1992). As a result, these difficulties are reported as the second most common reason for consulting a GP (Jenkins et al 1998) and are involved in 25 - 33% of GP consultations (Sharp & Morell 1989, Shah 1992). However, McLeod (1992) and Turton et al (1995) note that many GPs lack the time, training and confidence required to deal with these problems. As a result, treatment of mental health problems can be compromised in primary care settings. For example, Tylee & Donahue (1996) found that the majority of those treated with antidepressants in primary care settings are not treated for long enough in relation to guidelines and that tricylic antidepressants tend to be prescribed at sub-therapeutic doses. Moreover, less than half of an international sample of patients presenting with a mental disorder were identified by a primary care team (Sartorius et al 1996).

Greater support is clearly required and fortunately, due to changes in the financial and political climate, this may be becoming available. The NHS in Scotland Plan (Scottish Executive 2000) sets out a strategy to move resources from hospital to community based settings with a supporting redistribution of funds. Key goals in relation to mental health are to improve access to primary healthcare, improve collaboration with secondary services and to extend primary care services' range of functions.

As a consequence various theoretical models of joint working have been suggested to improve partnerships between Community Mental Health Teams (CMHTs) and Primary Care Health Teams (PCHTs) (Gask et al 1997, Onyett et al 1996). A "liaison-attachment" model

is suggested in particular in the paper " A Framework for Mental Health Services in Scotland" (Scottish executive 1997), where the CMHT develops a close relationship with the PCHT via a liaison worker (such as a CPN) aligned to each practice.

This approach has been piloted in the Inverclyde area of Scotland with the aim of developing a Liaison Community Psychiatric Nursing service for all local GP practices. Nurses have liased with specific practices and provided education, training, advice and consultation in relation to the assessment and management of "common psychiatric illness and non dependent drug or alcohol misuse" (Lyle unpublished p.1). They have also provided brief therapeutic interventions (0.6 WTE) often in the form of 'counselling' and problem solving due to the range and complexity of presenting social problems. However, staff are also trained in cognitive-behavioural therapy, which they offer where appropriate and can refer on to specialist secondary services or community organisations. For the purposes of this study the term "intervention" will be used to refer to this particular service change rather than to a specific type of intervention.

Early in-service reports suggest that the new service has been welcomed by GPs (Lyle & McGregor unpublished, Lyle unpublished) but, in line with the current climate for evidence based practise, the pilot-initiative is likely to attract further evaluations. It is hoped that these can identify necessary modifications at an early stage ensuring efficient use of resources. The approach must be broad and consider all perspectives including those of other services that could be affected by changes.

This study aimed to consider the impact of the new service on GP practice referral rates to Clinical Psychology. It was prompted by previous studies of the service, which had important

methodological flaws inherent to in-service audit (e.g. imprecise definitions of services, no control, a lack of consideration for confounding variables, etc.), but seemed to suggest a reduction in referrals to the local CMHT associated with CPN input.

In parallel with these findings, it was possible that the new service would result in a reduction in referrals to Clinical Psychology services. Also, consultation with CPNs may have reduced inappropriate referrals as specialist mental health staff are more familiar than GPs with psychology and have been shown to refer less non-attendees (Trepka 1986). In addition, early detection of problems may have prevented escalation to the point where input from Clinical Psychology services were required. However, Liaison input may have also improved detection of mental health problems. Moreover, a study investigating the effect of counsellors on referral rates did not seem to result in a decrease in referrals to Clinical Psychology services (Cape & Parham 1998). It is therefore possible that practices receiving interventions would not show any change in referral rates.

However, a study in Glasgow (McAuliffe & MacLachlan 1992) identified long waiting times as a key indicator for GPs of an unsatisfactory service and local waiting lists for Clinical Psychology services exceeded 20 weeks throughout the study time period. Also whilst most psychologists describe themselves as eclectic, White notes that cognitive-behavioural therapy is the "most commonly used " therapy (White 2000). Given that this approach was available through CPNs who had no waiting list, it was predicted that until liaison staff became overwhelmed, there would be a reduction in referrals to Clinical Psychology services for practices receiving intervention.

1.3 Aims and predictions

To investigate the impact of liaison CPNs on GP practice referral rates to Clinical Psychology services. Specifically:

1.) To compare referral rates between pre-intervention and post-intervention time periods, with predicted decreases in referral rates for two groups of practices subsequent to separate interventions.

2.) To compare intervention practices with a matched control group of practices.

3.) To consider the impact of extraneous variables as a secondary aim. These are not predicted to have affected referral rates.

1.4 Methodology

1.4.1 Design

A between and within subjects design was employed and allowed for Interrupted Time Series Analysis (ITSA) to consider potential reductions in GP practice referrals to Clinical Psychology services, associated with CPN-Liaison intervention. A comparison was made for two groups of GP practices between pre and post-intervention phases. Both active groups were also compared against a control group and variations associated with potentially confounding factors were considered.

1.4.1.1 Groups

Referrals from 3 groups of practices were investigated, which are specified below:

Intervention 1 Group	- Practices assigned to the first Liaison-CPN.
Intervention 2 Group	- Practices assigned to a second and third Liaison-CPN.
Control Group	- Practices who had not received input from Liaison-CPNs and who were drawn from a matched pool of practices. This group acted as a control for potential seasonal variations and other local factors that might influence referral patterns.

1.4.1.2 Phases

Data were collected for all groups from April 2000 to June 2003 and divided into pre and post -intervention phases based on the date of implementation of relevant interventions. Control Group data were therefore divided twice for two separate analyses.

1.4.2 Participants

1.4.2.1 Liaison-CPNs

The first CPN was employed in April 2001 to liase with a group of three practices, whereas the second and third were allocated to a further 4 practices in October 2002.

1.4.2.2 Selection of practices for Intervention

All practices studied were based at two separate health centres, which offer a centralised Primary Care service to two of the three main towns in a district in the West of Scotland.

Both of these communities were predominately urban and densely populated. Practices had been chosen for CPN-liaison input on the basis of high demands for specialist psychiatric services and high levels of relative deprivation. Deprivation levels were identified through Jarman scores (Jarman 1984), which provide a weighted average of various 1991 census variables. Groups of practices were comparable in terms of geographical situation, numbers of constituent GPs, size of population served and average deprivation scores. This information was obtained, for the purposes of this study, via the public health department and is presented in summary form only, to preserve confidentiality of individual practices. Each group of practices served populations of approximately 15,000 with a Jarman deprivation score between 5 and 10 and around 12 constituent GPs.

1.4.2.3 Selection of the Control Group

The Control Group of practices was selected on the basis of the four factors described above and was therefore considered comparable. However, it did serve a greater number of clients (17,500 as opposed to an average of 13,500 for the other two groups).

1.4.3 Procedure

1.4.3.1 Identification of data

Referrals were identified through the departmental referral record book. Relevant pages were photocopied and identifying details removed and shreded to ensure confidentiality. The remaining two columns of information included - "Name of referrer and agency" and "Date of reception of the referral". Generally, these were listed in monthly groups and in descending chronological order.

Referrals were allocated to groups by records of GP names derived from departmental practice lists. (The verification of GPs as belonging to particular groups is discussed below. See "Employment of GPs, registrars and locums and periods of absence".)

1.4.3.2 Data Gathering

Data tables were prepared (see anonymised version in appendix 1b), with relevant GPs' names plotted against months. Collation of data followed a systematic process designed to minimise errors and to reduce the time required in checking.

1. Cells on the data table were crossed through for months when particular GPs had not been in active service.
2. Names of referrers associated with other agencies (i.e. not GPs) were crossed through on the photocopied referral record sheets. This only occurred if there was clear evidence of a relevant agency code (e.g. rc = resource centre).
3. GP names were marked with different coloured highlighter pens for different groups.
4. Allocations were then rechecked for each group separately.
5. The remaining names were rechecked for omissions.
6. For each month, the number of referrals for each GP was recorded on the data table and the total number of referrals for each group was calculated and recorded.

1.4.3.3 Verification of data

1.4.3.3a Employment of GPs and registrars and periods of absence

As names of referring GPs were used to allocate referrals to groups, it was important to identify changes in GP practice staff complements. All relevant Practice Managers were

therefore contacted by telephone prior to data collection to clarify details of periods of employment and absence, for GPs and registrars. This information was used to accept or exclude referrals as belonging to particular groups. It was not possible to verify all GP-related information. However, all unexpected reports were successfully clarified and this system was therefore considered satisfactory in preventing misallocation of referrals. It also allowed consideration of factors associated with practice service histories that may have lead to variation in referral rates between groups and within groups over time.

1.4.3.3b Unclear records

Occasionally problems arose in definite identification of GPs and date of reception of referral, due to variations in spelling, problems with handwriting errors and GPs sharing surnames. These cases were allocated using the more detailed departmental catalogue system.

1.4.3.4 Other potentially confounding variables

1.4.3.4a Periods of absence of Liaison-CPNs

Discussions with the Liaison service Team Leader verified that CPN-liaison staff had not experienced any significant period of absence during the project.

1.4.3.4b Clinical Psychology Department

During the time span of the project waiting times for Clinical Psychology were published for review by referrers. This may have influenced GP referring practices and this information is therefore included in appendix 1c.

1.4.3.5 Approach to data analysis

Data were summarised with descriptive statistics and figures presented graphically to allow preliminary analysis, within groups and between the Control Group and each active group. Possible significant changes in trends over time were investigated through Interrupted Time Series Analysis (ITSA) using the computer package ITSACORR (Crosbie 1993). The approach was also adopted with the Control Group to consider any potential generic decline in referrals. The ITSA permits comparison of short, autocorrelated series of data occurring in adjacent phases (Crosbie 1993). It is regarded as more reliable than visual inference with typical clinical data (see e.g. Matyas & Greenwood 1990) and suitable for assessing change in this context as it can control for Type 1 errors associated with positive autocorrelation and has sufficient power (Crosbie 1993).

An additional comparison of combined median scores for intervention groups was conducted for pre and post-intervention phases. Potential variations in referral patterns associated with seasonal factors and changes in published waiting times for Clinical Psychology, were also considered.

1.5 Results

1.5.1 Was there a reduction in GP practice referrals to Clinical Psychology associated with Intervention 1 and Intervention 2?

INSERT TABLE 1.1 HERE

1.5.1.1 Intervention 1 and 2 - Preliminary analysis

Descriptive statistics relevant to Intervention 1 and Intervention 2 are presented in Table 1.1 (sections a) and c) respectively). These suggest reductions in both the number of referrals and the median monthly referral rate for post-intervention phases, as opposed to pre-intervention phases. However, ranges and inter-quartile ranges were relatively large with respect to relevant medians, indicating that differences between phases were unlikely to be significant.

The upper portions of Figure 1.1 and 1.2 provide graphical representations of the number of referrals per month for Intervention 1 and Intervention 2 practices. Lines of best fit for pre and post-intervention 1 and 2 phases suggest a gradual decline in monthly referral rates subsequent to interventions, as opposed to slight rises pre-intervention.

INSERT FIGURE 1.1 HERE

1.5.1.2 ITSA - Intervention 1 and Intervention 2 Groups - Pre and post intervention phases

ITSA was conducted on Intervention 1 and 2 Group data for adjacent intervention phases. Table 1.2, column a) and c) respectively, show relevant ITSA information. Overall there was no significant change between Intervention 1 phases and no significant change in intercept or slope. There was a trend towards overall change between Intervention 2 phases but this was not significant and there was no significant change in intercept or slope. ITSA therefore suggested that there was no difference in monthly referral rates, from Intervention 1 and 2 practices, as a consequence of CPN-Liaison intervention.

INSERT TABLE 1.2 HERE

1.5.2 Was there a generic decline in referral rates during Intervention 1?

1.5.2.1 Control Group - preliminary analysis with comparison to Intervention 1 Group

Descriptive statistics for the Control Group practices are presented in Table 1.1 for pre and post-intervention 1 phases (Table 1.1 section b) i)) and for pre and post-intervention 2 phases (Table 1.1 section b) ii)) and across the complete time span of the study (Table 1.1 section b) iii). Median monthly referral rates for the Control Group are similar to those of intervention groups for both pre-intervention phases. However, in contrast to intervention groups the median monthly referral rate for the Control Group does not appear to change during post-intervention phases.

The lower portions of Figure 1.1 and 1.2 provide graphical representations of the patterns of referrals for the Control Group and highlight variability between Control Group monthly referral rates throughout the project. Lines of best fit do not suggest a decline in referrals for pre and post-Intervention 1 phases but may indicate a decline during the post-Intervention 2 phase.

1.5.2.2 ITSA - Control Group - Pre and post-intervention phases

ITSA was also conducted on Control Group data for adjacent Intervention 1 and 2 phases. Relevant ITSA information is presented in columns b) and d) of table 1.2. There were no significant changes between phases overall or significant changes in intercept and slope. Hence there was no significant decline in monthly referral rates for the Control Group during either pre or post-intervention phases.

INSERT FIGURE 1.2 HERE

1.5.3 Comparison of overall medians for pre and post-intervention phases

Pre and post intervention phase medians were combined for Intervention 1 and Intervention 2 groups. This showed a halving in GP practice median monthly referral rates between phases for active groups, with a combined pre-intervention phase median of 11 and a combined post-intervention median of 5. The approach is not strictly valid as different time periods are been considered and comparison with Control Group data by this method is not appropriate, as data would be counted twice. However, the suggestion is of a marked reduction in referral rates to Clinical Psychology, associated with CPN-Liaison interventions.

1.5.4 Seasonal variation and the affect of publication of Clinical Psychology waiting times

Visual inspection of line graphs in figure 1.1 and 1.2 highlights varying referral rates for all practice groups amongst adjacent months and does not suggest any pattern of seasonal variation in referring practices. More detailed analysis is beyond the scope of this study, however, Crosbie (1993) notes that "many scores" are required to identify periodicity and an ITSA approach would therefore be inappropriate for these data.

Clinical Psychology waiting times published during the time span of the study are presented in appendix 1c. Increases in waiting times were noted from 20 to 22 weeks in July 2000 and from 22 to 26 weeks in December 2001. However, visual inspection of graphs, in figure 1.1 and 1.2, suggested an increase rather than a reduction in referrals subsequent to these dates.

1.6 Discussion

At a time of new investment and new configuration of Primary Care Mental Health services, critical evaluation of changes in service provision is essential to consider benefits, efficient use of resources and effects for all parties. In this vein, this study investigated the impact of a pilot Liaison-CPN service on GP practice referral rates to Clinical Psychology services. Contrary to predictions, there was no significant reduction in monthly referral rates in response to Liaison-CPN input, for two groups of practices. However, in accordance with predictions there was also no significant change in the monthly referral rates for a control group of practices with no CPN input. This suggests that CPN-Liaison intervention has not affected referral rates to Clinical Psychology services. The finding is in contrast to those of a Liaison-CPN in-service report, which demonstrated a reduction in the number of referrals, to another secondary mental health service, the CMHT (Lyle unpublished).

1.6.1 Reliability of results

The above conclusion must be considered within the context of the study where a variety of factors may have lead to Type II errors. For example, low base rates of monthly referrals for both groups of practices restricted the potential for a reduction due to a floor effect. In addition, large variations in referral rates between months may have undermined the consistency required to constitute a significant change. This instability in the data is related to

the limited scope of the study where the referring practices of individual GPs often had a disproportionate impact and this perhaps explains an apparent reduction in referral rates for the Control Group of practices. Small numbers also meant that the statistical power may have been insufficient to detect small changes. Support for this perspective is apparent from a halving in median monthly referral rates when pre and post-intervention phase medians were combined for intervention groups.

1.6.2 Problems within the study

A major difficulty in this study was in the collation and verification of relevant information, as recording systems are not easily accessible and vary between services. In particular, the validity of the investigation was partially undermined by a required reliance on human informants rather than records or difficulties in validating records when they were available.

1.6.3 What if a reduction in referrals is present but remains undetected?

The above qualifications raise the possibility of an undetected decrease in referral rates. However, even an apparent reduction would not necessarily constitute evidence of an effective intervention. Future evaluations will need to consider other issues such as therapeutic gains in comparison to other forms of treatment and cost effectiveness. Assessments of the service have also begun to consider GPs' perspectives but this will require further elaboration to include all members of the PCHT and service users to determine the relevance of the service, perceived benefits and desired changes. Clinical Psychologists possess unique skills in this sphere of health service research.

If GPs have begun to refer fewer individuals to Clinical Psychology, explanations are required to understand why other individuals have not replaced those seen by Liaison-CPNs. One

possibility is that GPs regard some patients as more appropriately treated by the PCHT or Liaison-CPNs rather than psychology. Certainly, nurses can now provide CBT, the main treatment offered by psychologists, which is regarded as the best supported psychotherapeutic approach available (DoH 2001). They may also be perceived by GPs as being better placed to work with typical mild-moderate patients both in terms of accessibility and in relation to connections with community organisations who can address common comorbid social problems. White notes that "all forms of psychotherapy are limited in dealing with social disadvantage" (White 2000). Perhaps GPs are reserving other more complex cases for psychology, which they regard as more suitable and as White suggests perhaps psychology needs to employ innovative and wide-ranging approaches rather than emphasising one-to-one treatment (White 2000).

1.6.4 Recommendations and conclusions for all services

1. Service changes require continuing comprehensive evaluation to ensure that effective and relevant decisions are made based on evidence.

2. Valid conclusions require well-designed studies and Clinical Psychologists are extremely suitable to conduct and oversee such investigations.

3. If mental health problems are to be treated largely within the primary care setting, services will require considerable reconfiguration to ensure effective and sustainable changes. This will necessitate continued and comprehensive discussions between services and with service users to negotiate roles and service provision.

4. Studies that identify the perspectives of GPs will be especially important in determining what services are required and how they are provided.

1.6.5 Recommendations and conclusions for the implementation of CPN-Liaison services

1. The role of the Liaison-CPNs is inherently stressful and appropriate levels of clinical and research support are necessary. Clinical Psychologists are well placed to provide this support as they possess broad Level 3 skills (Mowbrary report for Management Advisory Service 1995) in both areas, but an assessment of CPNs' own views of their limitations and needs is essential in determining support mechanisms.

2. The continued mobilisation of the PCHT to assist liaison-workers and improve treatment of mental health problems is advocated to ensure sustainable change.

3. Collaboration with liaison workers from all secondary services is essential if they are to fulfil an effective triage function.

1.6.6 Dissemination points

CMHRT

CPN-Liaison service

Argyll and Clyde Health Board

Clinical Psychology

Local Health Care Co-operative

1.7 Reference list

Cape, J. & Parham, A. (1998) Relationship between practice counselling and referral to out patient psychiatry and clinical psychology *British Journal of General Practice* 1998 Vol. 48:1477- 1480

Crosbie, J (1993) Interrupted Time-Series Analysis with Brief Single-Subject Data *Journal of Consulting and Clinical Psychology* 1993 Vol. 61, No. 6, 966 - 974

Department of Health (2001) Treatment Choice in Psychological Therapies and Counselling – Evidence Based Clinical Practice

Espie, C. A. & White, J (1986) Clinical Psychology and General Practice: a four year review *Health Bulletin* 1986 Vol. 44/5: 266-273

Gask L, Sibbald B, Creed F. (1997) Evaluating models of working at the interface between mental health services and primary care. *British Journal of Psychiatry* 1997;170:6–11

Goldberg, D & Huxley, P (1992) *Common Mental Disorders: A Biopsychological Approach"* Routledge: London 1992

Jarman, B (1984) Underpriviliged Areas: validation and distribution of scores *British Medical Journal* 1984 Vol. 289: 1587 - 1592

Jenkins, R. et al (1998) British psychiatric morbidity survey. *British Journal of Psychiatry* 173, 4-7

Lyle & McGregor (unpublished) Liaison-CPN service in-service report 2001

Lyle (unpublished) Liaison-CPN service in-service report 2002

Matyas, T. A. & Greenwood, K.M. (1990) Visual analysis of single-case time-series: effects of variability serial-dependance, and magnitude of intervention effects *Journal of Applied Behaviour Analysis* 1990 Vol. 23 341 -351

McAuliffe, E. & MacLaclan, M. (1992) Consumers' views of mental health services: the good, the bad and some suggestions for improvement. *Clinical Psychology Forum* 47, 16- 19

McLeod, J. (1992) The General Practitioner's Role In M. Sheldon (Ed) *Counselling in General Practice.* London: RCGP enterprises.

Onyett, Pidd, Cohen, *et al.* (1996) Mental health service provision and the primary health care team. *Mental Health Review* 1996: 1(3):8–16

Sartorius, N. et al (1996) Depression comorbidity with anxiety. Results from the WHO study on psychological disorders in primary health care. *British Journal of Psychiatry* 168 (supplement 30), 38-43.

Scottish Executive (1997) A Framework for Mental Health services in Scotland. Section 3: Service Profiles" NHSiS

Scottish Executive (2000) The NHS in Scotland Plan - 'Our National Health Plan - A plan for action, a plan for change'

Shah, A. (1992) The Burden of Psychiatric Disorder in Primary Care *International review of Psychiatry* 1992 Vol 4: 243 -250

Sharp, D. & Morell, D. (1989) The Psychiatry of General Practice In (Eds.) P. Williams et al *Scientific Approaches to Epidemiological Psychiatry* Routledge: London

The Management Advisory Service to the NHS (1995) *National Review of Clinical Psychology Services. Report Digest.* Gloucester.

Trepka, C. (1986) Attrition from an out-patient psychology clinic. *British Journal of Medical Psychology*, 59, 181-6

Turton, P. et al (1995) Mental health training needs in general practice. *Primary Care Psychiatry* 1: 197-9.

Tylee A, Donaghue JM. (1996) The treatment of depression: Prescribing patterns of antidepressants in primary care in the UK. *British Journal of Psychiatry* 1996;168:164–8

White, J. (2000) Clinical Psychology in Primary Care *Primary Care Psychiatry* 2000 Vol 6, No. 4: 127 - 136

Chapter 2 Major Research Systematic Review

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Research Supervisor: Dr Elizabeth Campbell

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2.1 Explicit memory bias for trauma-related material in individuals with posttraumatic stress symptoms: A systematic review of the literature.

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Abstract

The main models of information processing associated with memory bias in individuals with posttraumatic stress symptoms are reviewed. A computerised search of four databases and hand searching of references identified 101 potentially related empirical studies. Ten papers describing 13 relevant study tasks met inclusion criteria, and methodological quality was assessed against standardised criteria. There was little variance in overall quality but some key weaknesses were identified. Consistent with intrusive encoding and dual representation models of information processing, general support has been identified for explicit recall biases, but not recognition biases, towards trauma-related words in individuals with posttraumatic stress symptoms. Variability in findings, limitations of conclusions, clinical implications and recommendations regarding further research are discussed.

Keywords: Posttraumatic Stress, Trauma, Memory Bias, Recall, Prose, Passages

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2.2 Introduction

Posttraumatic stress disorder (PTSD) is a reaction to a traumatic event where survivors re-experience the event, avoid reminders of the trauma, and suffer heightened arousal (APA 1994). Ehlers and Clark (2000) proposed a cognitive model of PTSD, which suggested that symptoms would be maintained if individuals experienced "a sense of serious current threat.....[arising from] (1) excessively negative appraisals of the trauma and/or its sequelae and (2) a disturbance of autobiographical memory." (Ehlers & Clark 2000).

Ehlers & Clark (2000) suggested that negative trauma appraisals might evoke cognitive strategies such as *selective attention* to threat cues, which might contribute to the hypothesised sense of "serious current threat". In a review of empirical studies, Buckley et al (2000), concluded that there is "an attentional bias towards trauma-related stimuli" in individuals with posttraumatic symptoms relative to non-anxious individuals.

Another potential factor in the maintenance of symptoms may be a *selective memory bias* relating to threat cues. There has been little research to determine how this might operate and there are opposing theoretical predictions. Models have proposed that individuals with posttraumatic symptoms might show a) preferential memory for trauma-related material, b) a bias against remembering such material, c) either pattern depending on individual characteristics, circumstances and the course of symptoms, or d) an alternating pattern to memory functioning.

2.2.1 Overall aims of the current systematic review

This review aims to explore memory bias associated with trauma-related material in individuals with posttraumatic symptoms. The following section discusses relevant information processing models providing a general context for the literature review.

2.2.2 Information-processing theories relevant to memory bias following trauma

2.2.2.1 An *intrusive encoding model* - Memory bias for threat

Beck et al (Beck et al 1979, Beck et al 1985) proposed that cognition is directed by cognitive structures, schemata, which influence attentional processes, interpretation and memory for events. In anxious individuals schemata are considered to predominately relate to danger and vulnerability and to facilitate encoding and recall of threatening information when activated (Beck et al 1979, Beck et al 1985).

Litz and Keane (1989) theorised that individuals with posttraumatic symptoms have schema related to trauma-related experiences. These may be automatically triggered by exposure to stimuli that the individual relates to their trauma (Litz et al 1996). This may result in "involuntary retrieval of traumatic memories" (Zeitlin & McNally 1991) in the form of dreams, flashbacks and intrusive thoughts and images. Various researchers have also argued that activation of schema leads to automatic (intrusive) encoding and subsequent memory advantages for trauma-related material over non-threatening material (McNally et al 1998, Paunovic et al 2002, 2003, Zeitlin & McNally 1991).

2.2.2.2 A *vigilance-avoidance model*– Implicit bias for threat, explicit bias against threat.

Beck's cognitive model (Beck et al 1979, Beck et al 1985) treated memory, as a unitary faculty but empirical studies (Blaxton 1992, Roediger 1990) do not support this. A distinction has been made between implicit and explicit memory (e.g. Roediger 1990, Schacter 1987, 1998) based on evidence that each aspect may be mediated by different anatomical structures (cf Gabrieli et al 1995) and findings that manipulations have differing and sometimes opposing affects on each faculty (Roediger & McDermott 1993). Explicit memory requires conscious, effortful retrieval and is a voluntary strategic process. However, implicit memory involves automatic retrieval of material that has been retained unintentionally (Coles and Heimberg 2002).

Williams et al (1988) proposed a distinction between strategic and automatic processing in anxious individuals. Automatic allocation of attention towards threat was expected at the initial stages of information processing, producing implicit memory biases towards threat. However, it was postulated that when threatening stimuli evoked excessive anxiety, individuals would consciously orient away from in-depth analysis (elaborate processing) resulting in memory biases against threat (Williams et al 1988). Individuals with posttraumatic symptoms would therefore be expected to remember less trauma-related material on explicit memory tests relative to non-threatening material and to control individuals.

Mogg et al (1987) developed the term the "*vigilance-avoidance hypothesis*" to describe this presentation. The pattern matched clinical descriptions of PTSD (Litz et

al 1996) and was consistent with models implicating a lack of emotional processing as a maintenance factor in emotional disorders (e.g. Foa and Kozak 1986, Rachman 1980 summarised within Ehlers and Clark's 2002 model).

2.2.2.3 *Dual representational theory* – three separate information processing styles

Brewin et al (1996) proposed a dual representation model to account for different types of trauma memories. While flashbacks appear to constitute intense re-enactments of traumas, which are often difficult to modify, verbal trauma memories seem to be less detailed and to decay in intensity more easily.

"Verbally accessible memories" (VAMs) were considered to be the product of conscious processing of the traumatic event and intentionally retrievable. VAMs were thought to be limited in content because of limitations on the amount of information that can be consciously attended to and due to narrowing of attention towards threat during trauma.

Brewin et al (1996) noted, however, that rapid parallel processing of multiple inputs was possible through nonconscious processing, which was believed to produce a second set of more detailed representations and flashbacks. These *"situationally accessible memories"* (SAMs) appeared to be activated involuntarily by exposure to external and internal reminders of the trauma (i.e. objects/people and thoughts/images).

Both SAMs and VAMs were expected to bias attention and memory towards trauma-related information when individuals experienced marked posttraumatic symptoms.

This should produce implicit and explicit memory biases towards threat, which may maintain symptoms. However, it was also proposed that during recovery SAMs could be modified automatically (e.g. through desensitisation) and VAMs consciously edited (e.g. through cognitive reappraisal) so that they no longer biased information processing.

Brewin et al (1996) proposed further that some individuals may "prematurely inhibit" emotional processing and employ cognitive and behavioural avoidance strategies to "prevent the intrusion of [distressing] SAMs into consciousness". These strategies may become automatic allowing avoidance of "elaborative processing" and resulting in a vigilance-avoidance pattern. This group would be expected to have few posttraumatic symptoms and, if VAMs had been modified, to be able to discuss their trauma dispassionately. However, their apparent recovery was not thought to arise from the same mechanism as that underlying complete emotional processing of trauma.

2.2.2.4 An *alternating encoding* model – alternating memory biases

Zoellner et al (2003) argued that individuals with posttraumatic symptoms might alternate between encoding styles in association with different emotional states. Arousal might be associated with intrusive encoding and increased memory for trauma-related material and avoidant states associated with avoidant encoding and memory deficits.

2.2.3 Aims and focus of the current systematic review

This review focuses on investigations of explicit memory bias associated with trauma-related material, in individuals with posttraumatic symptoms. Implicit memory studies are not reviewed because information-processing models make similar predictions regarding related biases.

Brewin et al (1996) cautioned against memory bias studies employing trauma-exposed participants without diagnosed PTSD. According to dual representation theory, this group might include individuals with different types of memory bias patterns depending on whether they had prematurely inhibited or successfully completed emotional processing. However, no memory bias study has evaluated this theory and several papers have included trauma-exposed groups without PTSD or with subclinical symptoms. Indeed, it is possible, with respect to the latter, that cognitive biases remain present, albeit at a lower level than in individuals who meet diagnostic criteria. These investigations are therefore reviewed but patterns of memory bias in trauma survivors without PTSD are considered closely. If premature inhibition of processing is present then a marginal memory bias against trauma material may still emerge even when trauma-exposed control groups are heterogeneous. This would be associated with cognitive avoidance in premature inhibitors and an absence of any memory biases in recovered individuals.

The review also evaluates the methodological quality of studies to inform interpretation of evidence. Finally, it discusses the relevance of findings with respect to theoretical models and provides recommendations relating to further research.

2.3 Methodology

2.3.1 Search strategy

The following computerised databases were searched:

1. CINAHL - Cumulative Index to Nursing & Allied Health Literature 1982 to December Week 2 2004.
2. EMBASE 1980 to 2004 Week 50.
3. Ovid MEDLINE(R) In-Process & Other Non-Indexed Citations and Ovid MEDLINE(R) 1966 to Present (December 2004).
4. PsycINFO 1872 to December Week 2 2004.

Initial searches failed to identify some studies that had been referenced in key articles. Additional search terms were therefore added to ensure that as many studies as possible were identified through computerised methods.

The following keywords were used in the finalised search:

([MEMORY] or [RECALL] and the intersection of either of these two words with [BIAS]),

or

[COGNITIVE AVOIDANCE] or [AVOIDANT ENCODING] or [MEMORY DEFICIT] or [RECALL DEFICIT] or [RECOGNITION TASK] or [SEMANTIC PROCESSING]

and the intersection of the above set of words with the word set

[TRAUMA] or [PTSD] or [TRAUMATIC STRESS] or [POST TRAUMATIC STRESS] or [POSTTRAUMATIC STRESS].

(see appendix 2b for the Ovid Search table)

2.3.2 Inclusion criteria

Empirical studies that involved an investigation of explicit memory bias associated with trauma-related material, in individuals with posttraumatic stress symptoms.

2.3.3 Exclusion criteria

1. Studies that were not reported in English and that did not pertain to humans.
2. Case studies.
3. Unpublished dissertations.
4. Studies that pertained solely to implicit memory bias.

2.3.4 Reference searching

The reference sections of relevant reviews and included studies were hand searched.

2.3.5 Ratings of methodological quality of studies

The methodological quality of studies was investigated using a standardised data extraction table (see appendix 2c), developed by the author but based in part on SIGN and CONSORT guidelines for systematic reviews. Studies were allocated quality-rating scores based on a range of criteria and a standardised marking system. Further items allowed descriptions of study characteristics but were not allocated scores because assessed factors did not impact on methodological quality (*items in italics on rating form*).

Power calculations and/or effects sizes were referred to in only three studies and no investigation undertook power calculations to inform sample size selection. These factors were therefore not included as quality criteria.

Few studies mentioned blinding and only one paper explicitly described blinding procedures in administration and scoring (McNally et al 1998). Yet, some studies administered tasks through computers, effectively addressing this issue. In addition, many papers failed to report whether instructions and scoring were standardised and some failed to adequately describe instructions. However, there was little room for experimenter influence in the tasks. Consequently, these factors were not considered in the assessment of study quality.

A second independent rater assessed the quality of 50% of the studies. Inter-rater reliability for rated items across studies was high (spearman's rho = 0.96, n = 180, one-tailed, $p < 0.01$).

2.3.6 Effect sizes

It was not appropriate to compare findings by combining effect sizes because of significant methodological variations between studies.

2.4 Results

2.4.1 Study tasks for review

2.4.1.1 Computerised literature searches

The computerised search identified 101 papers but 39 did not meet inclusion criteria. A review of titles and abstracts resulted in further exclusions (32 and 10 respectively) and 10 other papers were excluded once the articles had been read. Consequently, 10 papers were retained.

2.4.1.2 Reference searching

No additional papers were identified through hand searching of references of included articles and relevant reviews.

2.4.1.3 Papers and study tasks to be reviewed

13 study tasks in 10 studies considering explicit memory bias in traumatised individuals were identified for review.

2.4.2 Findings

Findings are reported below under headings relating to different patterns of memory functioning that may operate in trauma victims. Table 2.1 provides brief descriptions of each study's methodology.

Table 2.1: Description of methodologies for each study included in the systematic review.

Insert Table 2.1 here

2.4.2.1 An absolute bias relative to control groups

Two studies found an absolute explicit memory bias for trauma-related material in individuals with PTSD compared to control participants.

Paunovic et al (2002) presented crime victims with acute PTSD and healthy age and sex-matched controls with a modified emotional stroop task and a tachistoscopic identification task, followed by a free recall task. Both groups recalled similar numbers of neutral words and more trauma words than neutral words. However, individuals with PTSD recalled significantly more trauma-related words than control participants.

Vrana et al (1995) presented Vietnam veterans with and without PTSD with a modified emotional stroop task followed by free recall and recognition tests. Participants were presented with neutral and emotionally negative words, Vietnam War-specific words with a neutral meaning and general Vietnam War words with negative emotional connotations. Groups did not differ significantly in recall of neutral words and both groups recalled more emotion words than control words. However, the Veterans with PTSD recalled a greater percentage of emotion words than veterans without PTSD. There was no specific advantage for trauma-related words. Emotion words were also more likely to be accurately recognised by both groups compared to control words and recognition accuracy was greatest for the two word categories with the highest stress ratings. Veterans with PTSD were more

accurate in their recognition overall but there was no specific advantages for any particular word type.

2.4.2.2 A Relative bias compared to control groups

Four studies provided support for a relative explicit memory bias towards trauma-related material.

Paunovic et al (2003) presented crime victims with acute PTSD and age and sex-matched healthy controls with randomly selected, black and white photographs of unfamiliar faces. Participants rated how likely each person was to behave in a hostile manner towards them and later completed a face recognition memory test. The PTSD group did not rate more faces as hostile compared to the control group. Control participants did not respond differently as a function of perceived hostility and both groups recognised similar proportions of hostile faces. However, individuals with PTSD recognised a greater proportion of hostile faces than non-hostile faces and fewer non-hostile faces than the control group. This difference remained significant after controlling for response bias.

McNally et al (1998) employed a directed forgetting paradigm to investigate the possibility of avoidant encoding of trauma-related material in adult survivors of Childhood Sexual Abuse (CSA) with PTSD. Regarding words that participants were instructed to "remember", a PTSD group recalled fewer neutral (and positive) words compared to healthy controls and CSA survivors without PTSD. Yet, there was no difference between groups in recall of trauma words and only the PTSD group recalled significantly more trauma words than neutral (and positive) words.

Zeitlin and McNally (1991) presented Vietnam veterans with and without PTSD with combat-related, social threat, positive and neutral words. Participants then undertook a cued recall test. There was no difference between groups in recall of combat and social threat words and both groups recalled more combat words than social threat, neutral or positive words. However, the PTSD group recalled fewer neutral and positive words than the trauma-exposed control group.

Moradi et al (2000) presented healthy children and adolescents and individuals suffering from PTSD (following road traffic accidents and assaults), with positive, neutral, trauma-related, threat-related and depression-related words. Participants then completed free recall and recognition tasks. Trauma, depression and threat-related words were combined in the analysis as negative words because separate categorisations proved unreliable. Both groups recalled and recognised more neutral words than (positive or) negative words. For recognition, there were no group differences according to word type. There was also no difference between groups in recall of negative words but the PTSD group recalled fewer neutral and positive words, compared to the control group. A further analysis indicated that neither depression-related nor threat-related words alone accounted for this recall bias.

2.4.2.3. An apparent memory bias in all trauma-exposed groups.

Litz et al (1996) recruited three different groups of Vietnam veterans: individuals with PTSD, well-adjusted controls, and psychiatric controls. Participants undertook a modified Stroop task involving two types of high and low-threat words: words related to military experience in Vietnam (military words) and words related to schooling

experiences (education words). This was followed by a recognition test, where participants also rated their level of confidence in recognition decisions. All three groups were very accurate in recognition and showed an advantage for high threat words over low threat words and military words over education words. There was no significant difference between groups and no specific bias for high-threat military words. Yet, further analysis indicated that all groups showed a response bias for military words over education words, for high threat words over low threat words and in particular for high-threat military words. This was especially exaggerated in the PTSD group.

2.4.2.4 A similar memory pattern in PTSD participants and healthy controls.

McNally et al (2001) employed a directed forgetting task involving trauma, positive and neutral words with women reporting repressed or recovered memories of childhood sexual abuse (CSA) and women without experience of CSA. The repressed memory group scored significantly higher than the non-traumatised control group on the PTSD measure and the recovered memory group had intermediate scores. There were no differences in recall associated with word type or group.

Dalgleish et al (2003) investigated memory biases in children and adolescents, diagnosed with PTSD, depression or generalised anxiety disorder and healthy controls. Participants completed a free recall task following presentation of trauma, threat, and depression-related words, and positive emotional and neutral words. Trauma and threat-related words were combined into threat-related words in the analysis. All groups recalled more depression-related and threat-related words than

neutral words but no group differences were reported. It is unclear if the advantage for threat-related words over neutral words was statistically significant.

Zoellner et al (2003) employed a directed forgetting paradigm after inducing states of either serenity (relaxation) or dissociation in female assault victims with PTSD and healthy female controls. Participants were presented with threat-related, positive and neutral words. There was no significant difference between groups in recognition of words but the PTSD group had poorer overall recall compared to the control group. Both groups recalled and recognised more threat words than positive and neutral words but there were no significant effects associated with serenity or dissociation.

2.4.3 Ratings of the quality of studies

The following section reviews the methodological quality of studies and discusses key variations in quality ratings for particular sections of the rating form.

2.4.3.1 Ratings of methodological quality

Table 2.2 provides ratings of methodological quality overall and for sub-sections of the rating form for each study.

Table 2.2: Ratings of methodological quality overall and for sub-sections of the rating form for each study included in the systematic review

Insert Table 2.2 here

Overall quality ratings ranged from 33.5 to 38.5 with a median of 34.5 and an inter-quartile range of 2.

Most studies were penalised significantly due to an absence of matched control groups and because of a lack of controls relating to encoding tasks (discussed below). There was little variation in overall methodological quality but some studies had particular key weaknesses. For example, McNally et al (1998) and (2001) were both penalised for poor reporting of sampling procedures. In contrast, Litz et al (1996) performed strongly in all areas and consequently scored highly overall.

It was not appropriate to apply different weightings to study findings due to similarities in quality ratings but the analysis highlighted key methodological issues, which are discussed further below.

2.4.3.2 Characteristics of control groups

Papers could be penalised more than once for failing to include different kinds of matched control groups. Five study tasks compared patients with PTSD solely against individuals without trauma histories, only three employed a trauma-exposed control group, and only two studies included both control groups. Only Zeitlin & McNally (1991) matched groups in terms of their level of trauma exposure.

Only two studies (Dalgleish et al 2003, Litz et al 1996) included non-traumatised psychiatric control groups. However, these studies, and most investigations employing trauma-exposed control groups, failed to control for variations in comorbidity during analyses of memory performance. McNally et al (1998) did

effectively assess the impact of depression and found negative correlations between recall of positive and neutral "remember" words and scores on measures of depression and PTSD (correlations did not achieve significance with respect neutral words).

Some studies did not effectively match groups for intelligence. Paunovic et al (2002 and 2003) and Zeitlin & McNally (1991) employed controls with higher levels of estimated intelligence than trauma participants, and McNally et al (1998) did not report intelligence levels.

2.4.3.3 Administration and nature of encoding task(s)

Only three studies (Litz et al 1996, Paunovic et al 2003, Vrana et al 1995) asked participants directly to rate the emotionality of trauma-related material.

No study fully controlled for the potential confound of positive and negative emotional valence. The emotionality of negative control words was assessed by participants in Litz et al (1996) and Vrana et al's (1995) studies and both found associated memory bias effects for this material as well as trauma-related material.

2.4.3.4 Analysis

Field et al (2005) noted that when evaluating differences amongst means, focused contrast analyses are statistically more powerful than unfocused ANOVAs followed by post hoc tests. The former statistical technique is applicable for analyses involving three or more comparisons but was not employed in some studies (Dalgleish et al 2003, Litz et al 1996, Zoellner et al 2003) that failed to identify clear memory biases amongst trauma-exposed individuals. Studies that did identify memory biases

probably suffered less from problems with statistical power because, generally, they had fewer groups and hence made fewer comparisons (this excludes Zeitlin & McNally 1991), or employed focused contrasts (McNally et al 1998).

2.5 Discussion

2.5.1 Direct support for recall biases towards threat

The findings of two reviewed studies were consistent with the predictions of both the intrusive encoding model and dual representation theory. McNally et al (1998) and Paunovic et al (2002) found evidence of explicit recall biases for trauma-related words over non-threatening words in individuals with diagnosed PTSD relative to individuals without trauma.

McNally et al (1998) also found that the explicit recall bias was not apparent in a trauma-exposed group without PTSD. Moreover, visual inspection of study means highlights a potential recall bias against trauma-related words in these individuals. This trend was not statistically significant and could have occurred by chance. However, it could be consistent with assertions of dual representation theory, suggesting that groups of apparently asymptomatic trauma survivors may include individuals who have prematurely inhibited emotional processing of trauma. The latter may avoid elaborative processing of trauma-related stimuli and hence exhibit memory deficits against such material.

However, two further studies (Zeitlin & McNally 1991, Vrana et al 1995) found recall biases for trauma-associated words in trauma-exposed groups without PTSD as well as more pronounced biases in PTSD sufferers. According to intrusive encoding and dual representation models, such biases should not be apparent in fully recovered controls. These effects may have been a consequence of familiarity with material arising from trauma exposure. Alternatively subclinical posttraumatic difficulties

apparent in trauma-exposed controls may have been sufficient to induce limited processing biases towards threat.

No study has identified a memory bias against trauma material specific to individuals with posttraumatic symptoms. This review does not therefore provide support for the vigilance-avoidance model (Mogg et al 1987, Williams et al 1988), which suggested that individuals with posttraumatic symptoms avoid encoding anxiety-provoking trauma material. Zoellner et al (2003) also failed to find support for their proposition that encoding styles and memory bias alternate in association with arousal or avoidance states.

2.5.2 Indirect support for recall biases towards threat

Vrana et al (1995) found that trauma-exposed individuals rated all negative emotional words as stressful and had a recall bias for these words as well as trauma-related words. Moradi et al (2000) also found a recall bias for negative material in children with PTSD relative to controls without a trauma history. These wide-ranging biases suggest that the trauma memory network can be generalised and activated by negative emotions as well as more concrete reminders of trauma. Litz et al (1996) suggested that this generalisation might develop over time and be most apparent in individuals with chronic PTSD.

Some findings suggested that memory biases may operate against a background of recall deficits for non-threatening material. This is consistent with a review by Buckley et al (2000), which concluded that there is "substantial evidence...that (independent of IQ) PTSD sufferers demonstrate impaired performance on standard

memory tests involving neutral information compared [to controls]". However, in the current review, the studies providing the strongest evidence for memory deficits for non-threatening material (McNally et al 1998, Paunovic et al 2002, and Zeitlin & McNally 1991) failed to fully control for variance in intelligence levels across groups. Memory deficits might therefore be due to the latter factor, which might have masked an absolute memory bias for trauma material.

Moreover, most reviewed studies failed to control for comorbidity and it is unclear whether memory bias for trauma words results from PTSD, comorbid disorders, or a combination of conditions. McNally et al (1998) found evidence that impairments associated with PTSD and depression undermine encoding of non-threatening words but not trauma words.

2.5.3 Studies that failed to detect recall biases towards threat

Three studies did not find any distinct recall patterns in trauma survivors and therefore failed to support any of the proposed models of information processing. Dalgleish et al (2003) and Zoellner et al (2003) found recall advantages for trauma words over non-trauma words but these were apparent in controls without trauma and trauma survivors. McNally et al (2001) did not find any group or word type effects. However, it is unclear whether stimuli employed in studies were sufficiently threatening to induce memory biases because participants were not asked to rate the emotionality of trauma-related material.

Moreover, manipulations of mood and/or encoding instructions in McNally et al's (2001) and Zoellner et al's (2003) studies may have masked memory bias effects.

Visual inspection of means for McNally et al's (2001) "remember" condition and Zoellner et al's (2003) "serenity/remember" condition, suggests potential differences between groups that were not detected in their analysis. In both cases, recall of trauma words was weaker than neutral words for healthy controls. However, this bias against trauma was not apparent for individuals with the most PTSD symptoms (McNally et al 2001) or less pronounced for participants with PTSD (Zoellner et al's 2003). There may therefore have been an undetected recall biases towards threat in PTSD sufferers relative to healthy controls, consistent with the intrusive encoding and dual representation models.

Considering "remember/serenity" conditions separately may be warranted when investigating memory bias using the directed-forgetting approach because the instructions most closely reflect those of a typical recall task. Indeed, using focused contrast analyses, McNally et al (1998) detected a strong memory bias effect ($r = 0.55$) specific to PTSD sufferers but only in a "remember" condition. This effect was not significant in their subsequent study (McNally et al 2001) but participants had fewer symptoms and diagnostic status was not assessed. Zoellner et al (2003) used statistically less powerful omnibus ANOVAs followed by post hoc tests and failed to find memory biases.

Visual inspection of means for McNally et al's (1998, 2001) "remember" conditions also suggests patterns which could be consistent with the proposition of premature inhibition of emotional processing in dual representation theory (Brewin et al 1996). Individuals with the most posttraumatic symptoms showed an absolute bias towards trauma words (McNally et al 1998) or a trend suggesting a relative bias (McNally et

al 2001). In contrast, trauma survivors with fewer symptoms showed trends suggesting biases against threat whereas untraumatised controls had only marginal biases. These differences may have arisen by chance and any conclusions based on the apparent patterns would be spurious. However, consistent with dual representation theory, it could be that cognitive avoidance operates in trauma survivors with partially remitted posttraumatic symptoms producing explicit memory biases against threat.

2.5.4 Findings relating to recognition bias

Definitive evidence has not been identified for an explicit recognition biases associated with trauma-related words. Studies have detected recognition biases towards negative emotional words, which are equivalent in trauma-exposed individuals with and without PTSD (Litz et al 1996, Vrana et al 1995). This could suggest that subclinical posttraumatic symptoms are sufficient to induce maximal biases or biases may simply be due to familiarity with trauma material. However, two other studies (Moradi et al 2000, Zoellner et al 2003) found equivalent biases in non-traumatised individuals as well as PTSD sufferers. Trauma material may therefore simply be more striking than other materials. Hence none of these recognition studies provide strong evidence to support the information processing models under review.

Moreover, Litz et al (1996) demonstrated in their study that differences amongst recognition accuracy across word types might have been falsely inflated by response biases. Trauma-exposed individuals, particularly those with PTSD, endorsed trauma-related words as previously seen even when they were uncertain but were more conservative in decision-making with non-threatening words (Litz et al 1996). Vrana et al (1995) also detected a response bias towards trauma material in trauma-exposed

individuals. However, greater recognition accuracy for combat related words emerged despite the marked response bias for these words.

Paunovic et al (2003) found evidence for an explicit recognition bias for hostile faces in PTSD sufferers relative to untraumatised individuals that remained significant after controlling for response bias. This could suggest that faces can be more meaningful to trauma survivors than words and hence more likely to induce recognition biases. This finding is consistent with the intrusive encoding and dual representation models but the absence of a trauma-exposed control precludes conclusions as to which model is more comprehensive.

2.5.5 Recommendations for future research

2.5.5.1 Blinding and standardisation procedures

More effective implementation and reporting of blinding and/or standardisation procedures is recommended for future studies to exclude experimenter effects.

2.5.5.2 Power

A lack of statistical power may have prevented some investigations from detecting subtle effects (Dalgleish et al 2003, Litz et al 1996, Zoellner et al 2003). Effect sizes and power should be routinely reported. For studies involving three or more comparisons, focused contrast analyses are recommended as statistically more powerful than unfocused ANOVAs followed by post hoc tests.

2.5.5.3 Controlling for factors relating to participants' characteristics

Several researchers have pointed to the need for non-traumatised psychiatric groups to control for comorbid disorders and state arousal (e.g. Litz et al 1996, Moradi et al 2000, Paunovic et al 2002).

The same investigators also called for trauma-exposed control groups without PTSD to separate effects arising from familiarity with trauma material and emotional congruence associated with posttraumatic symptoms. Litz et al (1996) noted that these groups should be matched for levels of trauma exposure.

In contrast, Brewin et al (1996), cautioned directly against this approach arguing that trauma-exposed groups without PTSD could include individuals with different patterns of cognitive biases depending on whether they had successfully completed or prematurely inhibited emotional processing. This could confound analyses. It may be possible to identify premature inhibitors because they are expected to exhibit "phobic avoidance of trauma-related stimuli; report more dissociation at the time of the trauma;" [and to hold] "unrealistically positive assumptions and beliefs" (Brewin et al 1996). This could allow construction of two separate trauma-exposed control groups and investigation of proposed memory biases against threat in premature inhibitors. Unfortunately, reliable indices have not yet been developed. Consequently, if studies do include trauma-exposed control groups this potential confounding factor should be considered carefully.

Controls for chronicity and factors associated with the long-term maintenance of PTSD, such as alcohol consumption, are also required.

The generalisability of findings is restricted, as studies have focused on specific trauma populations to ensure material is salient. Commonalities and specificities in memory bias across trauma populations could be investigated by replicating procedures and by presenting material relevant to individuals' own traumas and other trauma experiences.

Potentially confounding effects identified in this review, such as variation in intelligence levels between groups (e.g. McNally et al 1998, Paunovic et al 2002, 2003, and Zeitlin & McNally 1991) highlight the importance of adequate controls for demographic characteristics.

2.5.5.4 Materials employed in studies

Paunovic et al (2003) argued that "memory bias is a function primarily of the participants' cognitive interpretations and categorizations....rather than of the external stimuli [themselves]". They recommended that participants assess the personal emotional significance of trauma material and that classification for analysis be based on these subjective ratings, not externally prescribed categories.

Paunovic et al (2002) noted that in any trauma with an interpersonal context (e.g. assaults and combat-related trauma), both positive and negative emotional material might be meaningfully related to trauma despite an absence of inherent trauma associations. This provides one possible explanation for detected biases towards emotional material as well as trauma specific material. Future studies would benefit

from employing positive and negative emotional control materials (Paunovic et al 2002).

Words employed in studies were also often not matched for levels of semantic relatedness across categories. Controlling for this factor would avoid confounding memory advantages for particular categories.

2.5.5.5 Can single words elicit cognitive avoidance?

For studies to have ecological validity it is essential that stimuli are sufficiently threatening. However, Paunovic et al (2002) noted that more meaningful material than single words might be required to induce a sense of threat and associated memory biases. Indeed, Amir et al (1996) detected an implicit memory bias towards trauma-related sentences in PTSD participants that was not apparent with single words (McNally & Amir 1996). This raises the possibility that, with different materials, memory biases against threat may be detected in PTSD sufferers, consistent with the vigilance–avoidance hypothesis (Mogg et al 1987, Williams et al 1988, 1997) or, if detected in premature inhibitors, consistent with dual representation theory (Brewin et al 1996).

2.5.5.6 Response bias

Litz et al (1996) and Vrana et al (1995) demonstrated that response bias had exaggerated the impression of a recognition advantage for trauma-related material in trauma-exposed individuals. Litz et al (1996) concluded that because of extensive experience with threatening stimuli and associated responses, PTSD sufferers adopt a liberal decision-making criterion for classifying trauma-related stimuli as previously

seen and exhibit an associated liberal response bias. This tendency may be reinforced because it facilitates avoidance of potential threat but may elicit false alarms and maintain PTSD by contributing to a sense of serious current threat (Litz et al 1996). However, Vrana et al (1995) noted in their study that recognition bias had effects independent of response bias. Furthermore, accuracy of recognition was high for word stimuli in Litz et al's study (1996). They therefore noted that "it may have been too easy to recognise targets, leading to a ceiling effect for discriminability" that obscured any recognition bias.

Response bias might be controlled for by increasing the number of targets that participants are required to discriminate amongst. Recognition accuracy might decrease disproportionally for trauma-exposed groups due to excessive numbers of false identifications. However, if a bias towards threat remained apparent for individuals with PTSD it would be more likely to be a product of recognition, rather than response, bias.

Trauma survivors may also exhibit a response bias against naming stimuli that they fear in recall tasks. This might mask any memory advantage for trauma-related material or create a false impression of a memory bias against threat. Clearly response bias could be an important moderating factor to consider when designing studies.

2.5.6 Summary of findings, qualifications and recommendations

The reviewed studies have, for the main part, found evidence of explicit recall biases towards trauma-related material in PTSD sufferers. This is consistent with the

intrusive encoding and dual representation models of information processing. Some studies may have failed to detect this effect because of confounds associated with manipulations of encoding instructions (McNally et al 2001, Zoellner et al 2003) and other methodological issues (Dalgleish et al 2003, Zoellner et al 2003). Biases towards threat have also been detected in trauma-exposed individuals without diagnostic levels of PTSD. This could be due to familiarity effects arising from trauma exposure or subclinical posttraumatic difficulties, which may be sufficient to induce limited processing biases.

In two studies (McNally et al 1998, 2001) non-significant trends in trauma-exposed individuals without PTSD suggested recall biases against trauma-related material. This could be consistent with dual representation theory, which proposed that some individuals prematurely inhibit emotional processing of trauma, avoid "elaborative [cognitive] processing" of trauma-related material and subsequently exhibit memory biases against threat (Brewin et al 1996).

No study identified a recognition bias for trauma-related words specific to trauma survivors. Moreover, Litz et al (1996) argued that any detected recognition advantages might be largely the product of response bias. Yet, it is possible that a subtle recognition bias effect was masked in studies because of ceiling effects. In addition, Paunovic et al (2003) did detect a recognition bias towards trauma-related faces in PTSD sufferers, consistent with the intrusive encoding model and dual representation theory.

This review has provided recommendations relating to a series of methodological problems in studies. Key points are participants personally assessing the salience of material, controls for emotional valence, and the appropriate use of various matched control groups. However, Brewin et al (1996) advocated caution in employing trauma-exposed controls without PTSD to investigate memory biases because of potentially confounding patterns associated with premature inhibition of emotional processing of trauma.

Further research is required to answer a series of questions relating to memory bias in trauma-exposed individuals. Are biases operating in the context of general memory deficits? Is recall bias specific to PTSD or present in all trauma survivors? Do some individuals prematurely inhibit emotional processing of their trauma and display a distinct pattern of information processing biases? What is the role of comorbidity? Is recall bias specific to trauma-related material or apparent with other types of emotional material? Is there a subtle recognition bias effect and if so how is this mediated by response bias?

A productive strategy may be to investigate individual questions whilst controlling for other factors using a series of research studies that focus on particular trauma populations. This tight focus should maximise statistical power. However, it would also be beneficial if similar indices of memory bias were used to allow comparisons across studies and eventually across trauma populations.

2.5.7 Potential clinical implications of this review

Reviewed findings of recall biases towards trauma-related words are consistent with models suggesting that preferential encoding of threatening material occurs automatically in individuals with posttraumatic symptoms. Paunovic et al (2003) proposed that such memory biases could elevate the significance of stimuli, increasing a sense of serious current threat, hyperarousal and avoidance, and hence maintain posttraumatic symptoms.

McNally (1995) argued that if anxious individuals generally encode threat-related material automatically, then associated processing biases might be most appropriately addressed through exposure. However, techniques employed within cognitive therapy, such as reappraisal of post-trauma over-estimations of threat, should still be beneficial in facilitating engagement in exposure and in restoring a sense of safety. Yet, processing biases towards threat may repeatedly undermine these approaches and need to be taken into account in treatment.

Brewin et al (1996) also discussed clinical implications of their proposed phenomenon of premature inhibition of emotional processing of trauma. They noted that the apparent "cessation of active emotional processing" could be misleading because successful integration of trauma SAMs may not have actually been completed. Individuals might therefore be vulnerable to SAMs being reactivated and symptoms recurring if they were exposed to circumstances similar to their original trauma. Indeed, some presenting problems may actually be by-products of premature inhibition relating to previous traumatic events. Brewin et al (1996) therefore advocated careful assessment of possible premature inhibition. Key recommended

markers included evidence of phobic avoidance, "unrealistically positive assumptions and beliefs" and a vigilant-avoidant pattern with respect to attentional and memory biases. However, it has not been determined whether this phenomenon is genuine and reliable screening tools have not yet been developed.

Finally, the vigilance-avoidance hypothesis cannot be discounted, as studies have only investigated very basic stimuli under experimental conditions. It may be that when some trauma survivors are exposed to dynamic, uncontained stimuli in real-life situations, voluntary strategic processes do produce avoidant encoding and memory biases against threat in accordance with predictions of the vigilance-avoidance hypothesis. Such biases could prevent individuals from accurately retrieving information, and interfere with objective evaluation of future threats and promote avoidance (Mogg et al 1987). Cognitive therapy may target both of these issues by facilitating closer inspection of threatening material and concurrently allowing habituation.

Further research is required with more naturalistic materials and conditions. This may indicate that both automatic and strategic processes operate and help determine the most efficacious combination of treatment elements to target different information-processing mechanisms (Buckley at al 2000).

2.6 Reference List

American Psychiatric Association (1994). *Diagnostic and Statistical Manual of Mental Disorders (4th ed.)* Washington DC: American Psychiatric Association.

Amir, N. et al (1996) Implicit Memory Bias for Threat in Posttraumatic Stress Disorder. *Cognitive Therapy and Research, Vol 20, No. 6 pp. 625-635.*

Beck, A. T., Steer, R. A., & Brown, G. K. (1996). *Manual for the BDI-II.* San Antonio, TX: The Psychological Corporation.

Beck, A.T. et al (1979) *Cognitive therapy of depression: A treatment manual.* New York: Guildford.

Beck, A.T. et al (1985) *Anxiety disorders and phobias: A cognitive perspective.* New York: Basic Books.

Blaxton, T. A. (1992). Dissociation among memory measures in memory-impaired subjects: Evidence for a processing account of memory. *Memory & Cognition, 20, 549-562.*

Buckley, T.C. et al (2000) Information Processing and PTSD: A review of the empirical literature. *Clinical Psychology Review. 28, pp. 1041-1065.*

Coles, M.E. & Heimberg, R.G. (2002) Memory bias in the anxiety disorders: Current status. *Clinical Psychology Review, Vol. 22(4), pp. 587-627.*

Dalgleish, T. et al (2003) Patterns of Processing Bias for Emotional Information Across Clinical Disorders: A Comparison of Attention, Memory, and Prospective Cognition in Children and Adolescents with Depression, Generalized Anxiety, and Posttraumatic Stress Disorder. *Journal of Clinical Child and Adolescent Psychology Vol. 32, No.1, pp. 10-21.*

Ehlers, A. & Clark, D. M.(2000) A cognitive model of posttraumatic stress disorder. *Behaviour and Research Therapy. 38, pp. 319-345.*

Foa, E.B. & Kozak, M.J. (1986) Emotional processing of fear: exposure to corrective information. *Psychological Bulletin 99 pp. 20-35.*

Foa, E.B et al (1992) Uncontrollability and unpredictability in post-traumatic stress disorder: An animal model. *Psychological Bulletin 112 pp. 218-238.*

Gabrieli, J.D.E. et al (1995) Double dissociation between memory systems underlying explicit and implicit memory in the human brain. *Psychological Science 6 pp. 76-82.*

Gelinas, D.J. (1983) The persisting negative effects of incest. *Psychiatry, 46, 312-332.*

Horowitz, M. J. (1986) *Stress response syndrome* (2nd ed.) Northvale, NJ: Jason Aronson.

Kapsi, S.P. et al (1995) Cognitive processing of emotional information in posttraumatic stress disorder. *Cognitive Therapy and Research, 19, 433-444.*

Litz, B. T. et al (1996) Attention, Arousal, and Memory in Posttraumatic Stress Disorder. *Journal of Traumatic Stress, Vol. 9, No.3 pp. 497-519.*

Litz, B.T. & Keane, T.M. (1989) Information processing in anxiety disorders: Application to the understanding of posttraumatic stress disorder. *Clinical Psychology Review,* 9 pp.243-257.

McNally, R.J. & Amir, N. (1996) Perceptual Implicit Memory for Trauma-related Information in Post-traumatic Stress Disorder. *Cognition and Emotion, 10 (5), pp. 551-556.*

McNally, R.J. (1995) Automaticity and the anxiety disorders. *Behaviour Research and Therapy, 33, 747-754.*

McNally, R. J. et al (1998) Directed Forgetting of Trauma Cues in Adult Survivors of Childhood Sexual Abuse With and Without Posttraumatic Stress Disorder. *Journal of Abnormal Psychology, Vol. 107, No. 4 pp. 596-601.*

McNally, R. J. et al (2001) Directed Forgetting of Trauma Cues in Adults Reporting Repressed or Recovered Memories of Childhood Sexual Abuse. *Journal of Abnormal Psychology Vol.110, No.1, 151-156*

Mogg, K. et al (1987) Memory bias in clinical anxiety. *Journal of Abnormal Psychology. 96, pp. 94-98.*

Moradi, A.R. et al (2000) Memory Bias for Emotional Information in Children and Adolescents with Posttraumatic Stress Disorder: A Preliminary Study. *Journal of Anxiety Disorders, Vol 14, No.5 pp.521-534.*

Neshat-Doost, H. et al (1999) The development of a corpus of emotional words produced by children and adolescents. *Personality and Individual Differences, 27, pp.433-451.*

Paunovic, N. et al (2002) Attentional and memory bias for emotional information in crime victims with acute posttraumatic stress disorder (PTSD). *Journal of Anxiety Disorders 16, pp. 675-692.*

Paunovic, N. et al (2003) Memory Bias for Faces that are Perceived as Hostile by Crime Victims with Acute Post-traumatic Stress Disorder *Cognitive Behaviour Therapy vol 32, No.4 pp. 203-214.*

Rachman, S. (1980) Emotional processing. *Behaviour Research and Therapy 18, pp. 51-60.*

Roediger, H.L. (1990) Implicit memory: Retention without remembering. *American Psychologist, 45, 1043-1056.*

Roediger III, H.L. & McDermott, K.B. (1993) Implicit memory in normal human subjects. In: H. Spinnler and F. Boller (Eds) *Handbook of Neuropsychology.* Elsevier, Amsterdam pp 63-131.

Rosenthal, R. & Rosnow, R.L. (1985) *Contrast analysis.* Cambridge, England: Cambridge University Press.

Schacter, D.L. (1987) Implicit memory: History and current status. *Journal of Experimental Psychology: Learning, Memory, and Cognition, 13, 501-518.*

Schacter, D.L. (1998) Memory and awareness. *Science 280, pp. 59-60.*

Stroop, J.R. (1935) Studies of interference in serial verbal subtractions. J*ournal of Experimental Psychology. 18, 643-662.*

Terr, L. (1991) Childhood traumas: An outline and overview. *American Journal of Psychiatry, 148, pp. 10-20.*

Terr, L. (1994) *Unchained memories: true stories of traumatic memories, lost and found.* New York: Basic Books.

van der Kolk, B.A. (1987) *Psychological trauma.* Washington, DC: American Psychiatric Press.

Vrana, S.R. et al (1995) Selective Processing of Trauma-Relevant Words in Posttraumatic Stress Disorder. *Journal of Anxiety Disorders, Vol. 9, No.6 pp.515-530.*

Williams, J.M.G. et al (1988) *Cognitive psychology and the emotional disorders.* Chichester, UK: Wiley.

Williams, J.M.G. et al (1997) *Cognitive psychology and emotional disorders* (2nd ed.) Chichester, UK: John Wiley.

Zeitlin, S. B. & McNally, R. J. (1991) Implicit and Explicit Memory Bias for Threat in Post-traumatic Stress Disorder. *Behaviour Research and Therapy. Vol. 29, No. 5 pp. 451-457.*

Zoellner, L. A. et al (2003) Directed Forgetting Following Mood Induction in Chronic Posttraumatic Stress Disorder Patients. *Journal of Abnormal Psychology 2003, Vol. 112, No.3, pp. 508-514.*

Chapter 3 Major Research Project: Proposal

Depth-of-processing and trauma-induced memory bias in survivors of burns injuries.

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Depth-of-processing and trauma-induced memory bias in survivors of burns injuries.

3.1 Summary

The project aims to investigate patterns of memory bias in Post-Traumatic Stress Disorder (PTSD) by focussing on a burn-injured population. This group commonly experiences symptoms of PTSD during the first year post-burn. The study will explore the suitability of employing a prose-passage approach to investigate the role of depth of processing in this area. It will investigate whether there is a difference between burn-injured and non-anxious control individuals with respect to their recall of trauma-related and neutral prose passages. This approach differs from previous research involving memory bias and PTSD, in that the task requires more in-depth processing, in the form of interpretation and considered storage of material, rather than simply encoding of single words.

3.2 Introduction

The vigilance-avoidance theory (Mogg et al 1987) predicts attentional biases towards disorder-specific threats for individuals suffering from anxiety disorders. Such individuals are considered to devote excessive amounts of perceptual resources towards the encoding of emotionally threatening information. The theory also suggests that more elaborate processing of threat-related material is subsequently avoided. That is, anxious individuals may avoid in-depth analysis, interpretation and considered storage of such material, perhaps because such operations are perceived as too threatening to cope with. As a consequence, it is suggested that there may be memory biases away from disorder-specific threats in all anxiety disorders.

It is argued that these two types of biases are pivotal in maintaining anxiety disorders. The attentional bias is thought to be advantageous in that it probably facilitates the detection of danger but in anxious individuals may lead to an excessive emphasis on perceived threats. In addition, the hypothesised memory bias may prevent individuals from accurately retrieving information and hence reduce opportunities for habituation and/or objective evaluation. These biases may therefore explain why some material retains its anxiety-eliciting properties over time.

However, research investigating memory biases in anxiety disorders has yielded mixed results. The weight of evidence suggests explicit and implicit memory biases towards rather than away from threat in PTSD and Panic Disorder (e.g. McNally, Foa, & Donnell 1989, McNally et al 1987, Vrana et al 1995, McNally et al 1998 and Amir, McNally & Wiegratz 1996). Individuals suffering from these disorders recall more single words associated with their domain of fear than non-anxious individuals. Yet, other evidence indicates that such biases are not present in disorders like Social Phobia (Rapee et al 1994) and Generalised Anxiety Disorder (Mogg. Matthews & Weinman 1987).

These findings suggest that there may be disorder-specific cognitive styles. However, it is also possible that apparent memory biases towards threat are the product of stimuli employed in studies. To date, for PTSD, tasks have only involved relatively superficial processing i.e. encoding of single words. This may have resulted in activation of fear structures and subsequent attentional biases that were then reflected in increased recall. However, to assess memory bias more fully, tasks must involve more elaborate processing, such as organisation of material and ascription of meaning. It may be that when material includes contextual information, for example, it will be more likely to imitate the types of stimuli that PTSD sufferers typically encounter in their daily lives. This may increase the evocativeness of

material and produce a level of perceived threat of sufficient magnitude to interfere with processing and to result in a memory bias against threat. This pattern appears to be present in Social Phobia, where individuals do show memory bias against threat for prose passages requiring more elaborate processing (Wenzel & Holt 2002) but do not show such a bias in simpler task involving recall of single threat-related words (Rapee et al 1994).

It appears that the nature of stimuli employed in studies assessing anxious memory biases influences obtained results. It is also possible that studies pertaining to PTSD have failed to demonstrate a bias against threat because material has only included single words. It may therefore be beneficial to investigate this area further by adopting the approach that Wenzel and Holt (2002) employed with Social Phobia. This would involve presenting threat-related and neutral prose passages to a non-anxious control group and a group with a high level of PTSD.

However, other prose passage studies have detected patterns of memory bias towards rather than against threat with anxiety problems such as agoraphobia (Nunn, Stevenson & Whalan 1984) and spider phobia (Rusted & Dighton 1991). This suggests that a similar investigation involving prose passages and PTSD may still not yield the memory bias predicted by the vigilance-avoidance hypothesis (Mogg et al 1987).

Moreover, the umbrella term "PTSD" refers to a constellation of symptoms that can arise from a wide range of traumatic events and it may therefore be difficult to identify material that will be personally salient for all PTSD sufferers. This problem might be addressed by tailoring presentation material to a particular trauma group. A promising possibility would be to focus on individuals who have suffered traumatic burns, as passages might easily be developed that emphasised the consequences of traumas (burn injuries), which are likely to be

similar, rather than divergent causes. This group is also suitable because there is a notable prevalence of PTSD with reports of 30-31% meeting criteria while inpatients (Patterson et al 1990, Byrant 1996) and 29% still experiencing sub-clinical symptoms 12 months post-burn (Byrant 1996). Burn survivors also tend to experience high levels of cognitive avoidance (Tedstone and Tarrier 1997). Moreover, patterns of memory bias in those with sub-clinical symptoms are of interest because avoidance of processing may still be apparent in such individuals, as well as those who meet diagnostic criteria.

3.3 Aims and hypotheses

The study will attempt to investigate patterns of memory bias in PTSD by focussing on a population who have survived traumatic burns. It will adopt a similar approach to Wenzel & Holt's (2002) investigation of memory bias in social anxiety. Burn-injured participants and non-anxious control individuals will complete an explicit memory task of immediate recall following presentation of neutral prose and burn-related trauma passages.

It is difficult to provide directional hypotheses because of discrepancies amongst empirical findings relating to memory biases in anxiety disorders. In many cases findings are in direct contrast to predictions that might arise from the vigilance-avoidance hypothesis (Mogg et al 1987) for all anxiety disorders and from theories relating to avoidant memory patterns in PTSD (summarised in Ehlers & Clark 2000). This investigation will therefore be exploratory and will attempt to determine whether or not a prose-passage approach is viable for investigating patterns of memory bias in PTSD.

It is expected that there will be:

1. A difference, between burn-injured and non-anxious control groups, in percentage recall of novel trauma-related prose passages.

2. No difference, between burn-injured and non-anxious control groups, in percentage recall of novel neutral prose passages.

3.3.1 Covariants

Other factors that have been implicated in patterns of cognitive processing in anxiety disorders include the severity of disorders (McNally et al 1989) and comorbid state anxiety and depression (Reidy & Richards 1997). Levels of depressive, anxious and PTSD-symptom severity will therefore be considered as co-variants, particularly given the notable levels of comorbidity in PTSD (Kessler et al 1995).

3.4 Plan of investigation

3.4.1 Design

The study will employ a quasi-experimental, between-subjects design. Relationships will be investigated between levels of PTSD-related, depressive and anxious symptoms, and recall of trauma-related and neutral prose passages, following presentation of passages in a random, counter-balanced order to burn-injured participants and non-anxious control individuals.

3.4.2 Participants

21 individuals who have suffered burns between one month and one year previously and 24 non-anxious control participants matched for age, gender and educational history.

3.4.3 Recruitment

The control group will be recruited from several NHS staff groups (including domestic and administrative staff) based at Gartnavel Royal Hospital. Burn-injured individuals will be recruited via the inpatient ward and outpatient dressings clinic, at the West of Scotland Regional Burns Unit, Glasgow Royal Infirmary (GRI).

3.4.4 Inclusion and exclusion criteria

All burn-injured participants will be required to have experienced a "moderate" burn based on the guidelines of the American Burn Association (Moylan 1979). Those with "mild" or "severe" burns will be excluded. Inpatients and outpatients will not be treated as discrete clinical populations. This is because the similarity in their experience of burn injury should assist in minimising differences between groups. Also, a range of other factors will impact on PTSD severity and any associated memory bias (such as appraisals of the sequelae of burn injuries – Ehlers & Clark 2000) and these factors cannot be consistently equated with either subgroup.

Other exclusion criteria will include: unconsciousness when the burn was sustained and prior to hospital admission, a history of mania, psychosis, alcohol or substance misuse, head injury and learning disability.

3.4.5 Stimuli

'Story B' of the Logical Memory subtest, Weschler Memory Scale - 3rd edition (WMS-III, Weschler 1997) will be adopted as a neutral prose passage. A similar passage will also be created to serve as a second neutral passage because 'Story A' in the WMS-III subtest relates to a potentially traumatic incident and is therefore unsuitable. This stimulus and two trauma-related threat passages will be constructed to conform to the WMS-III passage in terms of

sentence structure and number of words. Two passages of each type are required to ensure that results are not skewed by the specific content of individual passages. All passages will be assessed using the Flesch Reading Ease score (Flesch 1948) and adjusted to ensure that they are matched for difficulty. Passages will be written at a level that has been identified as readable by 75% of the general population.

In line with suggestions made by Lundh, Czyzykow & Ost (1997) the content of trauma passages will emphasise inclusion of stimuli that are likely to be typically avoided, rather than items that individuals are expected to dwell on. This will increase the likelihood of passages pertaining to aspects of individuals' experiences that are relevant to cognitive avoidance and possible memory bias. Such stimuli will be identified through consultation with burns unit staff, members of a unit-based burns support group and analysis of burn-survivors' reports posted on the Internet. Trainee Clinical Psychologists and members of a burns unit-based support group will independently evaluate passages. The former will be asked to rate passages on a 5-point likert scale to ensure that they reflect more trauma-related anxiety than the neutral passages. However, both piloting groups will rate passages, using a similar scale, to ensure that prose is not considered overly unpleasant.

3.4.6 Measures

A brief questionnaire assessing demographic characteristics (age, gender, years of education).

3.4.6.1 The PTSD Diagnostic Scale (PDS) (Foa 1995).

A self-report measure that provides information on all 17 PTSD symptoms including the number of symptoms endorsed overall and for each Diagnostic and Statistical Manual-IV criterion (DSM-IV, APA 1994), and associated severity scores based on self-report ratings. It also allows the informant to detail the nature of the traumatic event and the level of functional

interference. There is satisfactory test-retest reliability, internal consistency, and convergent and concurrent validity (Foa 1995) and it is relatively quick to administer.

3.4.6.2 The Impact of Events Scale (revised) (Weiss and Marmar 1997)

A self-report measure that identifies levels of PTSD severity overall and provides an indication of levels of intrusion, avoidance and hyperarousal. It has demonstrated high test-retest reliability and internal consistency but does not fully correspond to DSM-IV PTSD symptoms.

3.4.6.3 The Hospital and Anxiety and Depression scale (After Zigmond & Snaith 1983,

A self-report measure that identifies current levels of anxious and depressive symptomatology but excludes physical symptoms, which may be disproportionally represented in clients with comorbid physical health problems. It has been demonstrated that it can effectively distinguish between the constructs of anxiety and depression (Bramley et al 1988).

3.4.7 Procedure

The full experimental procedure will not be disclosed to participants until after administration, as this might influence their responses. However, they will be provided with sufficient information to allow them to sign a consent form prior to a session. Participants will first complete the questionnaire assessing demographic characteristics. Standardised instructions from the WMS-III will then be adopted for each passage with participants being asked to learn material for later recall. This will take place immediately after each passage had been presented via a pre-recorded audiotape. All four passages will be presented to each participant in one out of 24 possible orders. The order will be randomly assigned to control for a possible affect of order of presentation with each new participant receiving the next order of presentation in the series. Each participant's responses will also be recorded on tape.

Two blind raters (Trainee Clinical Psychologists), whose inter-rater reliability could be compared, will later score participants' responses to the passages. For the standard neutral passage, scoring procedures from the WMS-III manual will be used as guidelines for rating responses. However, scoring criteria, similar to those specified in the WMS-III, will need to be developed and applied for other passages.

At the end of each session, participants will be asked to complete the other questionnaires, in one of six possible orders, which will be randomly assigned in a similar manner to the presentation of passages.

3.4.8 Settings

Testing will take place under suitable conditions for a test of immediate auditory recall, which are specified in the WMS-III administration and scoring manual (Weschler 1997). Clinical Psychology staff at the Burns Unit have confirmed that rooms will be available on site and similar facilities will need to be identified for the control group.

3.4.9 Equipment

For presentation of materials - one tape recorder and six tapes (for presentation in 4 factorial different orders) or one Laptop computer with audio presentation and editing facilities.
For recording responses - a recording stick and 12 tapes.
Measures described above, including the WMS-III and constructed passages and sufficient WMS-III response sheets.

3.4.10 Power calculation

This study will be designed to test the hypotheses that there will be a difference, between burn-injured and non-anxious control groups, in percentage recall of novel trauma-related passages but no difference with respect to recall of neutral prose passages.

In order to establish an appropriate sample size, a power calculation has been computed using the study conducted by Wenzel and Holt (2002) mentioned above. These researchers found a significant difference between social phobics and non-anxious controls, in percentage recall of socio-evaluative threat passages, with an effect size of 0.98. Since this study employed the same type of procedure as the proposed study, this is considered to be an appropriate estimate of an effect for this investigation.

Power calculations indicated that 21 subjects will have to be recruited for the burns group and 24 for the control group to achieve power of 0.9, with a two-tailed hypothesis and a significance level of $p = 0.05$. This calculation is based on an assumption of unequal variances between groups, with a wide range of trauma-related symptoms and associated variability in recall of trauma passages predicted for the experimental group but not for the control group.

3.4.11 Data analysis

All statistical analyses will be carried out using SPSS 10 for Windows.

Independent T-tests will be employed to ensure that the control group is matched to the trauma group for age and years of education, and a chi-squared test will ensure gender matching. Cohen's Kappa coefficient will be used to consider inter-rater reliability of blind raters and to evaluate whether passages represent more trauma-related threat than neutral

passages. In addition, independent T-tests will be employed to investigate whether groups differ in terms of levels of PTSD, depressive and anxious symptomatology. If there is a significant difference between groups for the latter factors, they will be included in the main analysis as co-variants.

The main analysis will involve a 2 (group: burn injured, non-anxious control) X 2 (passage type: trauma-related threat, neutral) repeated measures ANCOVA. Post Hoc analyses could consider the effect of covariants, PTSD symptom severity overall and the influence of levels of Avoidance, Intrusion and Hyperarousal symptoms.

3.4.12 Practical applications

The study should provide information on the viability of employing a prose passage paradigm to the investigation of memory biases in PTSD and highlight any required adaptations to the approach. If a difference is detected between groups, results may assist in resolving the current discrepancy between theoretical perspectives and findings in PTSD research. The study may also provide partial validation of theoretical models and/or treatment approaches or promote adaptations.

3.4.13 Time-scale

April to June 2004:	Continue to establish referral contacts and develop study materials.
August 2004:	Submit to ethics.
September 2004 to March 2005:	Data collection.

April to July 2005: Write-up research paper.

3.4.14 Ethical approval

Ethical approval will be sought from Greater Glasgow PCT and GRI ethics committees. Mechanisms have been organised through the Clinical Psychology service at GRI for any participant requiring support. Measures have also been specified to ensure that stimuli are not received as overly traumatic and to allow participants to provide informed consent without disclosing the full study rationale. Consent will also be sought from relevant staff at recruitment sites.

3.5 Reference List

American Psychiatric Association (1994) *Diagnostic and Statistics Manual of Mental Disorders* (4th Ed.). Washington, DC: Author.

Amir, N., McNally, R.J. & Wiegratz, P.D., (1996) Implicit memory bias for threat in post-traumatic stress disorder. *Cognitive Therapy and Research* 20, p. 625–636.

Bramley, P. N. et al (1988). The differentiation of anxiety and depression by rating scales. *Acta Psychiatrica Scandinavica. Vol 77(2) Feb 1988, 133-138.*

Byrant RA. (1996) Predictors of post-traumatic stress disorder following burns injury. *Burns*;22:89-92.

Coles, M.E. & Heimberg, R.G. (2002) Memory biases in the anxiety disorders. *Clinical Psychology Review,* Vol 22, Issue 4, p. 587-627

Ehlers, A. Clark, D.M. (2000) A cognitive model of posttraumatic stress disorder. *Behaviour Research & Therapy. 38(4):*319-45.

Flesch, R. (1948) "A New Readability Yardstick" *Journal of Applied Psychology, 32 (3) p. 221 - 233*

Foa, E.B. (1995). *Posttraumatic Stress Diagnostic Scale (manual).* Minneapolis, MN: National Computer Systems.

Kessler, R. C., et al (1995). Posttraumatic stress disorder in the National Comorbidity Survey. *Archives of General Psychiatry* 52, p. 1048-1060.

Lundh, L. G., Czyzykow, S., & Ost, L. G. (1997). Explicit and implicit memory bias in panic disorder with agoraphobia. *Behaviour Research and Therapy, 35*, 1003–1014.

McNally, R.J. et al (1987). Sensitivity to stress-relevant stimuli in posttraumatic stress disorder. *Journal of Anxiety Disorders*, 1, 105-116.

McNally, R. J., Foa, E. B., & Donnell, C. D. (1989). Memory bias for anxiety information in patients with panic disorder. *Cognition and Emotion, 3*, 27–44.

McNally, R.J. et al (1998). Directed forgetting of trauma cues in adult survivors of childhood sexual abuse with and without posttraumatic stress disorder. *Journal of Abnormal Psychology* 107, p. 596–601.

Mogg, K.et al (1987). Memory bias in clinical anxiety. *Journal of Abnormal Psychology, 96*, 94–98.

Moylan, J.A. (1979) First aid and transportation of burned patients. In C.P. Artz, J.A. Moncrief and B.A. Pruitt. *"Burns - A Team Approach"*, p. 151 - 156. W. B. Saunders and Co.

Nunn, J. D., Stevenson, R. J., &. Whalan, G (1984). Selective memory effects in agoraphobic patients. *British Journal of Clinical Psychology, 23*, 195–201.

Patterson D.R. et al (1990). Post-traumatic stress disorder in hospitalized patients with burn injuries. *Journal of Burn Care Rehabilitation* 1990;11:181-184.

Rapee, R et al. (1994). Memory bias in social phobia. *Behaviour Research and Therapy, 29*, 317–323.

Reidy, J. & Richards, A. (1997). Anxiety and memory: A recall bias for threatening words in high anxiety. *Behaviour Research and Therapy, 35*, 531–542.

Rusted, J. M. & Dighton, K. (1991). Selective processing of threat-related material by spider phobics in a prose recall task. *Cognition and Emotion, 5*, 123–132.

Tedstone, J. E. and Tarrier, N. (1997) An investigation of the prevalence of psychological morbidity in burn-injured patients. *Burns*, 23, 550-54.

Vrana, S.R., Roodman, A. & Beckham, J.C., (1995). Selective processing of trauma-relevant words in post-traumatic stress disorder. *Journal of Anxiety Disorders* 9, pp. 515–530.

Weiss, D.S. & Marmar, C. R. (1997) The Impact of Events Scale - Revised. In J.P. Wilson & T.M. Keane (Eds), "*Assessing psychological trauma and PTSD*". p. 399 - 411. New York: Guildford Press.

Wenzel, A. & Holt, C.S. (2002) Memory bias against threat in social phobia
British Journal of Clinical Psychology
Vol 41, Part 1, p. 73- 79.

Weschler, D. (1997) *Weschler Memory Scale - 3rd Edition*
San Antonio TX: Psychological Corporation

Zigmond AS, Snaith RP. (1983) The Hospital Anxiety and Depression
Scale.
Acta Psychiatrica Scandinavia 67:361-370.

3.6 Amendments to Major Research Project: Proposal

Greater Glasgow NHS Primary Care Division Ethics Committee approved revisions to the proposal on two occasions. Amendments are summarised below. To increase clarity changes relating to hypotheses and the power calculation are presented together. Specific amendments are then summarised separately.

3.6.1 Process of ethical review

The ethics committee approved the proposal on November 30th 2004 after clarification had been given regarding several points discussed below. However, further amendments were required due to recruitment difficulties, and relevant information coming to light relating to study design and hypotheses. These were submitted on February 22nd 2005 and given ethical approval on April 14th 2005.

3.6.2 Changes to study hypotheses

The original proposal argued that there would be a difference between the burn injured and control groups in percentage recall of trauma-related passages but did not predict a direction for this difference. This was because different bodies of literature specified opposing patterns of memory bias. The ethics committee requested "clarification of the use of two-tailed hypothesis." Following a discussion with the course research tutor it was agreed that, given the evidence for memory biases towards threat in PTSD, a one-tailed hypothesis would be used.

However, on further reflection and upon refinement of the argument the direction of the hypotheses was altered to be consistent with the main proposal of the study. In

line with Wenzel and Holt (2002), it was predicted that prose passages would require more in-depth processing than single words used in previous trauma studies and therefore might evoke sufficient anxiety to produce memory biases against threat. Hypotheses were also altered to take into account hypothesised general memory impairments in individuals with posttraumatic symptoms (Buckley et al 2000). It was therefore predicted that burn injured participants would have a memory bias against both passage types relative to controls but that this would be greater for trauma material than for neutral material.

3.6.3 Changes to the power calculation

Further clarification was given regarding the method for the power calculation before the original proposal was approved by the ethics committee.

In accordance with the change from a two to a one-tailed hypothesis, the power calculation was recalculated reducing the target sample size from 24 and 21 for the control and trauma groups respectively to 20 and 17. This was based on a power target of 0.9. Power of 0.8 is normally deemed sufficient to avoid Type II errors (Cohen 1988, 1992). However, the higher power target was adopted to allow recruitment of a larger sample given that the Wenzel and Holt's (2002) study provided an unreliable basis for the power calculation (see study paper for further discussion).

3.6.4 Specific amendments

3.6.4.1 The ethics committee initially requested "review of statistical procedure ...". Subsequent changes made to the "Data analysis" section of the protocol included:

- Specification regarding the approach that would be adopted to assess the normality of data, any transformations that might be required to allow parametric testing and reference to the potential need for non-parametric tests.
- Clarification regarding the use of ANOVA as opposed to an ANCOVA (specified originally) and discussion regarding potential covariants, which might warrant the use of ANCOVA.

3.6.4.2 The ethics committee requested "that the phrase 'depth of processing' be clarified." Amendments were therefore made to pages 2 and 3 ("summary" and "introduction" sections) of the study proposal, involving the addition of an explanatory paragraph and some other minor content changes.

3.6.4.3 Several elements were removed from the "data analysis" section of the original study protocol, as they were more appropriately placed within other sections.

- The sentence pertaining to statistical comparisons between group demographic characteristics was moved to the "participants" section.
- The discussion regarding trainee psychologists' expectations of distress for passages was moved to the "stimuli" section.
- The discussion regarding blind raters' scoring of passages was moved to the "procedure" section.

3.6.4.4 Burn severity inclusion criterion

The inclusion criterion relating to burn severity was altered to allow individuals with any burn greater than 1% Total Body Surface Area to participate. The unit where recruitment was taking place received very few cases of "moderate" burns, the level of severity originally targeted for recruitment, and employed a different classification system to that adopted in the original proposal. The new study criterion allowed individuals with milder injuries to participate. This was in keeping with the burns unit system and justified by relevant research (Tedstone &Tarrier 1997).

3.6.4.5 Stress and salience ratings for passages

An additional task was introduced involving participants rating the level of stress evoked by passages and burns survivors rating how much each passage reminded them of their own trauma. Stress and reminiscence ratings allowed the consideration of whether evoked anxiety was associated with any detected memory bias.

3.6.4.6 Inclusion of individuals with alcohol misuse problems

In their review, McDonald and Davey (1996) reported prevalence rates of alcoholism ranging from 6 to 17% from studies of burns survivors but indicated that these may represent underestimates arising from incomplete sampling methods. Individuals with alcohol misuse problems were originally excluded because of potential effects of alcohol use and injury arising from use on memory. However, this limited the generalisability and ecological validity of the study and hampered recruitment. Exclusion criteria were therefore altered to allow individuals to participate even if they had suspected alcohol misuse problems. This still allowed the study to consider the effect of trauma-induced memory bias because current alcohol use would be

expected to have an equal impact on memory for neutral and trauma passages. To assess any impact of this variable a brief measure of alcohol problems, the Alcohol Use Disorder Identification Test (AUDIT) was added to the procedure.

3.6.4.7 Use of personal and occupational contacts as members of the control group

To increase recruitment of control individuals the researcher's personal and occupational contacts were added as potential participants. All controls were recruited through posters and the researcher did not approach individuals until they indicated that they were interested in the study. A Consultant Clinical Psychologist, agreed to be available as a therapeutic contact for all members of the control group in the extremely unlikely event that they became distressed by the research task. Questionnaires did not require disclosure of specific details of medical and trauma histories but participants could have volunteered this information. Procedures were therefore implemented to ensure that individuals in both groups were aware prior to participation that disclosures were not required (see study paper appendix).

3.6.4.8 Inclusion of individuals up to 18 months post burn

To facilitate recruitment inclusion criteria were extended to include individuals who experienced their burn up to 18 months previously. While individuals might be less likely to have posttraumatic symptoms, cognitive biases have been found in individuals between 5 and 19 years after their burn injury (Willebrand et al 2002). None of the individuals who eventually took part exceeded the original 12-month post-burn inclusion criterion.

Chapter 4 Major Research Project

Trainee: Stephen Marks

Research Supervisor: Dr Elizabeth Campbell

Submitted in part fulfilment of the degree of Doctorate in Clinical Psychology at the University of Glasgow.

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4.1 Depth-of-processing and trauma-induced memory bias in survivors of burns injuries

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Objective: This study investigated potential memory biases associated with trauma-related material in burns survivors.

Design: A quasi-experimental, between-group design was employed.

Method: Thirteen burn-injured participants with variable levels of posttraumatic symptoms were compared with fifteen control individuals, in their recall of neutral prose and burn-related trauma passages.

Results: Control participants had superior overall recall relative to burns participants, after controlling for potentially confounding factors. Both groups had equivalent but non-significant recall biases towards trauma material. Subsequent analyses involved visual inspection of means for three subgroups constructed using the median IES-R score for the burn-injured group. Overall recall appeared to be weaker for high-symptomatic burns survivors compared to low-symptomatic burns participants. Biases towards trauma material appeared to be smallest in low-symptomatic burns survivors

and greatest in high-symptomatic burns participants, with intermediate bias levels for low-symptomatic controls.

Conclusions: Self-report ratings of salience and transient stress responses in burns survivors indicated that the prose-based paradigm is suitable for investigations involving trauma survivors. Findings relating to overall recall could be due to general memory deficits in burns survivors associated in part with posttraumatic stress symptoms. Contrary to expectations, there was no evidence of an explicit memory bias against trauma material in burns survivors. Indeed response patterns suggested biases in the opposite direction in high-symptomatic burns participants. This was more consistent with intrusive encoding or dual representation models rather than a vigilance-avoidance model. A memory bias against trauma material in low-symptomatic burns survivors relative to other subgroups was not significant but could be consistent with dual representation theory. The ecological validity of the study, other methodological issues, potential clinical implications, and recommendations regarding future research are discussed.

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4.2 Introduction

4.2.1 Information processing biases and posttraumatic symptoms

Estimates of the incidence of Posttraumatic Stress Disorder (PTSD) after a traumatic event range between 9 and 24% (Breslau et al 1991, Breslau et al 1998, Kessler et al 1995), with higher rates for women (20.4%, Kessler et al 1995, 17.9% Resnick et al 1993) than men (8.2% Kessler et al 1995). Figures vary depending on trauma type, for example rates are particularly high for male (65% Kessler et al 1995) and female rape victims (35 to 80% Rothbaum & Foa 1993, Breslau et al 1991).

There are three main models of information processing associated with trauma survivors; an intrusive encoding model (e.g. Zoellner et al 2003), a vigilance-avoidance hypothesis (Mogg et al 1987, Williams et al 1988, 1997) and dual representation theory (Brewin et al 1996).

The intrusive encoding model postulated that cognition in anxious trauma survivors is directed by cognitive structures, schemata, characterised by themes of vulnerability and danger associated with trauma experiences (Litz & Keane 1989). Schemata appear to be automatically activated by exposure to trauma stimuli (Litz et al 1996). Various researchers have argued that this leads to automatic (intrusive) encoding and subsequent memory advantages for trauma-related material over neutral material (e.g. McNally et al 1998, Paunovic et al 2002, 2003, Zeitlin & McNally 1991).

Williams et al (1988) and Mogg et al (1987) suggested an alternative vigilance-avoidance pattern. Automatic allocation of attention towards threat was expected at

the initial stages of information processing. However, it was postulated that when threatening stimuli evoked excessive anxiety, individuals would consciously orient away from in-depth analysis (elaborate processing) resulting in a memory bias against threat (Williams et al 1988, Mogg et al 1987). On memory tests involving conscious, effortful retrieval (explicit memory tests), individuals with posttraumatic symptoms would therefore be expected to remember less trauma-related material relative to neutral material and to control individuals.

Brewin et al (1996) proposed a dual representation model of memory functioning, to account for two different types of trauma memories. *"Verbally accessible memories"* (VAMs) were believed to be the product of conscious processing of the trauma, intentionally retrievable but limited in content. However, a "*situationally accessible memory* (SAM) system" was thought to reflect more extensive nonconscious processing. It was thought this system was activated involuntarily by exposure to reminders of the trauma, producing intense, detailed flashbacks. Brewin et al (1996) suggested that both SAMs and VAMs biased attention and memory towards trauma material when individuals were experiencing marked posttraumatic symptoms.

Brewin et al (1996) proposed that during recovery SAMs could be modified automatically and VAMs consciously edited so that they no longer biased information processing. However, some individuals might "prematurely inhibit" emotional processing and employ cognitive and behavioural avoidance strategies to "prevent the intrusion of [distressing] SAMs into consciousness". These strategies might become automatic allowing avoidance of "elaborative processing" and resulting in a vigilance-avoidance pattern of information processing. These individuals were expected to have

few posttraumatic symptoms but might have modified VAMs that allowed them to discuss their trauma dispassionately. However, their apparent recovery was not thought to arise from the same mechanism as those underlying complete emotional processing of trauma.

4.2.2 The role of memory biases in the maintenance of posttraumatic stress

If memory biases for trauma material are genuine then they could elevate the significance of stimuli, heighten a sense of threat and promote avoidance, thereby contributing to the maintenance of posttraumatic symptoms (Paunovic et al 2003). Alternatively, memory biases against threat could preclude individuals from accurately retrieving information. This would reduce opportunities for habituation and/or objective evaluation of threatening material and could explain why stimuli retain anxiety-provoking properties (Mogg et al 1987). If we can determine which pattern or patterns of memory biases are operating it may be possible to make appropriate modifications to treatments.

4.2.3 Findings from empirical studies of explicit memory bias in trauma survivors

A systematic review (see Chapter 2) of the few empirical studies investigating memory bias effects in trauma survivors has found broad support for recall biases towards threat in individuals with PTSD, consistent with the intrusive-encoding and dual representation models. Some of the reviewed studies also found evidence of significant biases towards threat in trauma survivors without diagnostic levels of PTSD. This could be due to familiarity effects arising from trauma exposure or subclinical posttraumatic difficulties inducing limited processing biases. However,

other investigations found non-significant trends suggesting biases against threat in these individuals. The latter might have occurred if premature inhibitors were present in trauma-exposed groups and provide additional support for dual representation theory.

4.2.4 An absence of a vigilance-avoidance pattern in empirical studies

The use of single words as trauma material in the majority of the reviewed studies (see chapter 2) might have confounded study findings. Such stimuli may not be meaningful enough to sufficiently activate trauma schemata (McNally et al 2001, Paunovic et al 2002) and to induce memory biases. Potentially, memory bias could be assessed more fully through tasks requiring more in-depth, meaningful and elaborate processing. In Social Phobia, socio-evaluative prose passages have been employed in this vein with findings of a memory bias against threat (Wenzel & Holt 2002), which were not apparent in recall of single threat-related words (Rapee et al 1994). If similar types of material were employed in trauma studies, memory biases against threat might also become apparent.

4.2.5 The current study

This study employed prose passages to investigate explicit memory bias in trauma survivors. To increase the potential salience of passages, prose relating to a specific trauma population, namely burns patients, was developed. This group was selected because of apparent commonalities in experiences across burn types and consistent estimates of case levels of PTSD in at least 30% of burns survivors during the first year post-burn and high levels of subclinical symptoms (Patterson et al 1990, Bryant 1996, Lawrence et al 1996, Tedstone & Tarrier 1997) (see appendix 4b).

Burns survivors with subclinical levels of PTSD were allowed to participate to maximise recruitment because neither the intrusive encoding model nor the vigilance-avoidance hypothesis suggest that memory biases abruptly cease when symptoms drop below diagnostic levels. Brewin et al (1996), cautioned directly against this approach because of the potential confound of premature inhibition of emotional processing. However, no study that has investigated explicit memory bias in trauma survivors has provided any statistically significant findings consistent with this phenomenon or considered dual representation theory. Individuals with subclinical posttraumatic symptoms were therefore included in the main analysis but memory patterns were carefully reviewed in subsequent analyses.

Furthermore, Buckley et al (2000) summarised ten studies indicating that individuals with posttraumatic symptoms may demonstrate general memory deficits. It was noted that this factor might interact with an avoidant encoding style and exaggerate any memory bias against trauma material in burns survivors relative to controls.

4.2.6 Aims and hypotheses

Burn-injured participants were compared with control individuals in their recall of neutral prose and burn-related trauma passages. Participants rated passages to determine whether it is possible to create scripts that are typically perceived as threatening by burns patients. It was expected that memory capacity in burns survivors would be compromised by general memory deficits associated with variable levels of posttraumatic symptoms (Buckley et al 2000) and that recall of trauma

passages would be additionally affected by a trauma-related avoidant encoding style (Mogg et al 1987, Williams et al 1988).

It was predicted that:

1. Burn-injured participants would recall a greater percentage of neutral prose passages compared to trauma-related passages.

2. Control participants without burn histories would recall a greater percentage of both passage types compared to burn-injured participants but would not exhibit differences in recall performance across passage types.

3. A recall advantage for control participants over burn-injured participants would be greater for trauma-related passages than for neutral passages.

4.3 Methodology

4.3.1 Design

The study employed a quasi-experimental, between-group design. Relationships were investigated between burn-injured participants and control individuals in recall of trauma-related and neutral prose passages, presented in a counter-balanced order.

4.3.2 Power calculation

The main study hypothesis predicted that on average the burn-injured group would recall a greater percentage of neutral prose passages compared to trauma-related passages.

Studies investigating trauma-induced memory bias have employed single words as stimuli and were not suitable to establish an appropriate sample size. Wenzel & Holt's (2002) study was therefore used for this purpose due to procedural similarities with the current investigation and because a more suitable basis for a power calculation was not available. This was despite differences between the studies including Wenzel and Holt's (2002) focus on a different disorder and their exclusion of individuals who did not meet diagnostic criteria.

Wenzel and Holt (2002) found a significant memory advantage in social phobics for neutral passages compared to socio-evaluative threat passages with a calculated effect size of 1.02. A power calculation conducted using the UCLA power calculator (http://calculators.stat.ucla.edu/powercalc/) indicated that for this target effect size, 17 burns survivors and 20 controls were required to achieve power of 0.9.

(significance p = 0.05 (one-tailed), based on an assumption of unequal variances between groups). Typically, power of 0.8 is considered sufficient to avoid Type II errors (Cohen 1988, 1992) but the higher target was adopted because the basis for the power calculation was not ideally suited to the current study.

4.3.3 Participants

Participants were 13 individuals (9 men and 4 women) who had suffered burns within the past 306 days and 15 control participants (10 men and 5 women) who had never been burnt. This was sufficient to achieve power of 0.8, based on the Wenzel and Holt (2002) study. Burn causes, location and severity, and duration since burn were heterogeneous (see appendix 4c).

4.3.4 Recruitment sources

Participants were volunteers. The control group were occupational and personal contacts of the author (see appendix 4d for further details). Staff at a Regional Burns Unit recruited burn-injured individuals. Over a 3-month period the consent rate for a sample of potential burns participants was 29.2% (7 out of 24 individuals). Eight individuals (33.3%) cited the potential stressfulness of the task as their reason for not participating, whereas 9 (37.5%) did not volunteer a reason.

4.3.5 Inclusion and exclusion criteria

Burn-injured participants could be included if they, had suffered their burn between one month and 18 months previously and were considered medically fit to participate by medical staff. They were excluded if their burn was less than 1% total body surface

area (TBSA), if the burn had been self-inflicted, or if a friend or relative had been killed or seriously injured during the burn incident.

Control participants were excluded if they had ever suffered a burn greater than 1% TBSA.

All participants were at least 18. Other exclusion criteria applied to both groups were an identified or suspected history of: alcohol induced brain damage, active drug misuse or methadone use, head injury leading to unconsciousness, learning disability, dementia, manic depression or mania, schizophrenia or psychosis.

4.3.6 Stimuli

Participants were presented with two neutral and two trauma-related prose passages (see appendix 4e). 'Story B' of the Logical Memory subtest, Weschler Memory Scale - 3rd edition (WMS-III, Weschler 1997) was adopted as the first neutral prose passage. The author constructed the second neutral passage and the two trauma-related passages, which were matched in terms of number of sentences (5) and words (85), and Flesch Reading Ease scores (69-69.1%) (Flesch 1948).

Trauma passage content focused on emotional and behavioural responses (e.g. panic and attempts to escape) and sensory sensations repeatedly emphasised in victim reports in a book regarding burns survivors' social construction of self (Stouffer 1994).

4.3.7 Measures

(see appendix 4f for psychometric properties of measures)

Measures included:

A brief questionnaire assessing demographic characteristics (age, gender, years of education) (see appendix 4g).

4.3.7.1 The PTSD Diagnostic Scale (PDS) (Foa 1995).

A self-report measure that assessed all PTSD criteria included in the Diagnostic and Statistical Manual-IV (DSM-IV, APA 1994), therefore providing an indication of whether individuals were likely to meet diagnostic criteria (Resick & Calhoun 2001). Individuals rate 17 symptoms for severity (using 0-3 scales) providing an overall severity rating (ranging from 0-51).

4.3.7.2 The Impact of Events Scale (revised) (IES-R) (Weiss and Marmar 1997)

A self-report measure that assessed levels of intrusion, avoidance and hyperarousal (8, 8, and 6 items) using 0-4 scales and yielding total scores ranging from 0-88. In a study investigating the psychometric properties of the IES-R with male Vietnam veterans, Creamer et al (2003) recommended a cut-off of 33 to provide the strongest indication of PTSD diagnostic status (sensitivity = 0.91, specificity = 0.82). They also suggested that the IES-R "may be [particularly] sensitive to a more general construct of traumatic stress in individuals with lower levels of symptoms." This second PTSD measure does not fully correspond to DSM-IV diagnostic criteria for PTSD (Resick &

Calhoun 2001) but was included to ensure the study was as sensitive as possible in identifying posttraumatic symptoms.

4.3.7.3 The Hospital and Anxiety and Depression scale (HADs) (Zigmond & Snaith 1983)

A self-report measure that identified current levels of anxious and depressive symptomatology, with 0-3 ratings for 7 items in each subscale and yielding scores ranging from 0-21. Scores above 8 are considered to be "cases". Physical symptoms that may be disproportionally represented in clients with comorbid physical health problems are excluded.

4.3.7.4 The Alcohol Use Disorders Identification Test (AUDIT) (Babor et al 1989, 2001, WHO)

In a review McDonald and Davey (1996) reported prevalence rates of alcoholism ranging from 6 to 17% from studies of burns survivors but indicated that these may represent underestimates arising from incomplete sampling methods. To allow consideration of this potential confound, the Audit assessed levels of alcohol consumption and associated problems. Ten items are self-rated using 0-4 scales and yielding scores ranging from 0 - 40.

4.3.8 Procedure

Ethics committees from Greater Glasgow NHS Primary Care Division and North Glasgow University Hospitals Division approved ethical aspects of the study.

Staff from the Burns' Unit were acquainted with patients' histories and had access to hospital notes. They completed exclusion criteria forms for any potential burn-injured participant (see appendix 4h), and if criteria were not met briefly described the project to individuals and distributed information packs (see appendix 4i for burn-injured participant information sheet). Potential control participants were directed to information packs (see appendix 4j for control participant information sheet) through posters (see appendix 4k). They returned a self-certification exclusion criteria form (see appendix 4l) if they did not meet exclusion criteria.

Participants could have volunteered sensitive details of medical and trauma histories through questionnaires. Procedures were therefore implemented to ensure that individuals were aware prior to participation that disclosures were not required (see appendix 4m for further details).

For burn-injured participants the research task was administered in a room adjacent to the burns unit (9 individuals), on the ward (1 individual) or at another outpatient facility (3 individuals). Control participants attended at various hospital locations. Testing took place under suitable conditions for a test of immediate auditory recall (Weschler 1997).

Individuals initially provided written consent (see appendix 4n (i) and (ii)) and then completed the questionnaires. Controls were administered part 1 of the PDS (Foa 1995) but only completed this questionnaire and the IES-R (Weiss & Marmar 1997) if they reported a continuing impact of trauma exposure.

A test track recorded onto a Toshiba SP2100 computer through Windows Sound Recorder ™ was presented via Windows Media Player ™ and the volume adjusted to suit each participant. Participants' speech was recorded using Windows Sound Recorder ™ and a Sony Electret Condenser Microphone (ECM-MS907), which was adjusted as necessary.

Passages were presented via recorded Windows Media Player ™. audio tracks. Standardised instructions from the WMS-III were adopted for each passage with participants being asked to learn material for later recall. Presentation order was matched across groups. Each passage was presented first for three participants only to control for practice effects (see appendix 4o). Trauma passages were never presented together as the first two tracks to reduce the risk of distress.

Participants then rated passages presented in written format, using 10-point scales, for the level of stress evoked (see appendix 4p). Burn-injured participants also rated how much each passage reminded them of their own trauma (see appendix 4q). Finally, individuals were given an information sheet documenting a telephone number for a designated Clinical Psychologist should they experience study-related distress (see appendix 4r (i) and (ii)).

For the standard neutral passage, scoring procedures from the WMS-III manual were used for rating responses. For other passages similar scoring criteria were developed by the author to parallel those of the WMS-III passage (see appendix 4s (i) and (ii)).

4.3.8.1 Data analysis

All statistical analyses were carried out using SPSS 13 for Microsoft Windows.

Prior to formal data analysis, data were inspected to ensure that assumptions for parametric tests were met. Where data were not normally distributed, as indicated by Kolmorogov-Smirnov tests (see appendix 4t), transformations were attempted using appropriate techniques (Tabachnick & Fidell 2001). However, skewness and kurtosis were excessive (Tabachnick & Fidell 2001) and non-normal data (for PDS total, HADs depression and Passage stress ratings) could not be rectified. Non-parametric tests were therefore employed where appropriate.

4.4 Results

Descriptive Statistics

(Due to high levels of skewness for several variables, medians and inter-quartile ranges are also presented in appendix tables with titles for these tables relating to means tables discussed below (e.g Table 4.3a relates to Table 4.3, etc.)

4.4.1 Demographic characteristics of groups

Mean age and years of education for the burn-injured and control groups are presented in Table 4.1 with standard deviations and ranges.

Table 4.1: Demographic variables for the burn-injured and control groups.

Insert Table 4.1 here

Independent sample t-tests confirmed that the groups were matched for age t (26) = -0.068 (ns) and years of education t (26) = 0.29 (ns). Gender ratios were also equivalent across groups (Fisher's exact test, p = 0.604).

4.4.2 Psychological characteristics of groups

Table 4.2 presents means and standard deviations of psychological variables for the burn-injured and control groups (see appendix 4u for factor scores on PTSD measures).

Table 4.2: Psychological variables for the burn-injured and control groups.

Insert Table 4.2 here

Potential differences between groups were investigated with independent t-tests and Mann-Whitney tests. For t-tests, Levene tests indicated that equal variances could not be assumed. There were no significant differences between groups in mean HADs anxiety ($t(18.03) = 1.04, p = 0.31$, ns), mean Audit scores ($t(14.01) = 1.26, p = 0.23$, ns) or mean HADs depression ($Z = -1.62$, ns). However, the burn-injured group had a significantly higher mean PDS total score ($Z = -3.52$, $p = 0.0001$ *exact sig)* and a significantly higher mean IES-R total score ($t(14.79) = 2.98$, $p < 0.01$).

The pattern of PDS responses was compatible with PTSD diagnostic criteria for five (38.46%) burns survivors but only three individuals (23.1%) scored above the IES-R cut-off (Creamer et al 2003). No controls had diagnostic levels of posttraumatic symptoms (see appendix 4v for further details of participants' trauma histories). Five burn survivors and two controls scored above the Audit cut-off (Saunders et al. 1993). With respect to the HADs, five burns patients and two controls had 'case' levels of anxiety and four burns participants and one control had 'case' levels of depression (Zigmond & Snaith 1983).

4.4.3 Stress ratings for passages

Stress ratings could range from "0 – not all stressful" to "10 – extremely stressful". Stress data were severely negatively skewed. Stress medians and inter-quartile ranges, as a function of group and passage type, are therefore presented below in Table 4.3a, instead of means.

Table 4.3a: Median stress ratings by group and passage type.

Insert Table 4.3a here

To allow between group comparisons for stress ratings across passage types a difference score was calculated for each participant by subtracting ratings of neutral passages from those of trauma passages. This controlled for marginally higher ratings for neutral passages in the burn-injured group compared to controls. Table 3b presents medians and inter-quartile ranges for stress rating difference scores as a function of group and passage type.

Table 4.3b: Median stress rating difference scores by group and passage type.

Insert Table 4.3b here

Due to the ordinal level of these data a Mann-Whitney test was conducted. Median stress difference scores were significantly higher ($Z = -2.23$, $p = 0.025$ *exact sig*) in the burn-injured group.

4.4.4 Salience ratings for passages in the burn-injured group

Mean salience ratings (range 0-10) for the burn-injured group are presented in Table 4.4. Higher ratings indicated greater salience.

Table 4.4: Salience ratings in the burn-injured group by passage and passage type (n = 12)

Insert Table 4.4 here

Due to the ordinal level of these data a Wilcoxon Signed Ranks test was conducted. Mean salience ratings were significantly higher for trauma passages ($T = -2.81$, $p < 0.01$).

4.4.5 Mean percentage recall for passages across groups

Means and standard deviations for percentage recall as a function of group, passage type, overall recall and passage are presented in Table 4.5.

Table 4.5: Percentage recall by group, overall recall, passage and passage type.

Insert Table 4.5 here

4.4.6 Was there a memory bias against trauma material specific to the burn-injured group and superior overall recall for the control group?

To examine the hypothesis for an explicit memory bias against trauma-related material in burns survivors, a mixed ANOVA was conducted on mean recall of passages, with Group (2: Burn-injured, Control) as between subjects variable and Passage Type (2:trauma, neutral) as within subjects variable. Focused contrast analyses are statistically more powerful than unfocused ANOVAs with post hoc tests but were not applicable because fewer than three comparisons were involved (Field 2005) (Personal Communication, D. Young – Consultant Statistician, Greater Glasgow NHS Primary Care Division). There was a main effect of Group ($F(1) = 6.91$, $p < 0.05$) with the control group recalling a greater percentage of passages overall but no significant main effect of Passage Type or significant interaction.

4.4.6.1 Memory bias index

A difference score was calculated for each participant by subtracting recall of neutral passages from recall of trauma passages. This produced an indication of the extent of any bias associated with trauma-related material i.e. a memory bias index. Visual inspection of memory bias indices suggested that groups had an equivalent recall advantage for trauma passages over neutral passages (burn-injured mean memory bias = 4.62 (s.d. 7.37), control group mean memory bias = 4.93 (8.21).

4.4.6.2 Did memory performance vary in association with alcohol use?

It was not appropriate to exclude all burn-injured participants scoring above the Audit cut-off when controlling for the potential confound of alcohol use. This would have also excluded 5 out of 7 of the burns survivors with the highest levels of posttraumatic symptoms and produced a very small sample size of 8 individuals. Two burn-injured participants with high outlying Audit scores were therefore excluded. Modified group mean Audit scores were consequently almost identical (modified burn-injured group m 4.96, sd 3.77, median 4, IQR 8, control group m 4.87, sd 3.25, median 5, IQR 3). The mixed ANOVA on mean recall of passages was repeated with Group (2: Audit Modified Burn-injured, Control) as between subjects variable and Passage Type (2:trauma, neutral) as within subjects variable. The main effect of Group remained significant ($F(1) = 4.21$, $p < 0.05$) with the control group recalling a greater percentage of passages overall but there were no other significant effects.

4.4.7 Did recall patterns vary in association with PTSD symptomatology?

No theoretical model provides predictions of differential recall patterns across the range of posttraumatic symptom levels detected within this study. To allow consideration of potential effects of PTSD symptomatology, the burn-injured group was therefore divided, using the group median IES-R total score, to create two similarly sized subgroups. Subgroups consisted of a) individuals with an IES-R Total score of 15 or greater (an IES-R high-symptomatic group, n = 7) b) individuals with an IES-R Total score less than 15 (an IES-R low-symptomatic group, n = 6). An IES-R low-symptomatic subgroup of controls (n = 14, IES-R Total score less than 15) was also created (see supplementary tables 4.6 and 4.6a for means and medians for PTSD measures as a function of subgroup).

Mean percentage recall as a function of passage type is presented in Figure 4.1 and Table 4.7 for each subgroup. Table 4.7 also presents subgroup means for percentage overall recall and difference scores between trauma and neutral recall.

Table 4.7: Percentage recall by passage type and overall recall, and mean difference scores between trauma recall and neutral recall as a function of Subgroup.

Insert Table 4.7 here

Figure 4.1: Percentage recall as a function of Subgroup and Passage type

Insert Figure 4.1 here

Due to the arbitrary delineation of subgroups and their small size, post hoc statistical comparison of subgroup means was not performed (Personal Communication, D. Young – Consultant Statistician, Greater Glasgow NHS Primary Care Division). However, visual inspection suggested that IES-R low-symptomatic controls had greater mean overall recall than the two other subgroups and IES-R high-symptomatic burns survivors had the weakest recall. Visual inspection of memory bias indices suggested that there was a memory advantage for trauma passages over neutral passages in all subgroups. This was negligible in the IES-R low-symptomatic burns survivors but more pronounced in the other two subgroups and greatest for IES-R high-symptomatic burns survivors. Low-symptomatic burns survivors had an apparent recall advantage for neutral passages compared to high-symptomatic survivors but equivalent trauma recall.

4.5 Discussion

4.5.1 Were there memory bias effects specific to the burn-injured?

Contrary to predictions, there was no significant recall advantage for neutral material relative to trauma material in burns survivors. The absence of this effect does not seem to be due to low levels of posttraumatic symptoms. Visual inspection of memory bias patterns suggested a stronger, and not weaker, bias towards threat in burns survivors with higher levels of symptoms. Given the small sizes of burn-injured sub-groups this pattern could be due to chance and requires further exploration. However, findings were not consistent with the vigilance-avoidance hypothesis, which suggested that anxious individuals consciously orient away from elaborate processing of threatening material and exhibit memory biases against threat (Mogg et al 1987, Williams et al 1988, 1997).

Intrusive encoding and dual representation models both postulate automatic encoding of trauma-related stimuli and memory biases towards such material in individuals with clear posttraumatic symptoms (e.g. Brewin et al 1996, McNally et al 1998, Paunovic et al 2002, 2003, Zeitlin & McNally 1991). Yet, an equivalent non-significant memory bias towards trauma material was apparent in controls and burns survivors with variable levels of posttraumatic symptoms. This suggested that trauma passages may have simply been more memorable than neutral passages.

However, the study could have failed to detect memory biases towards trauma material because of low levels of posttraumatic symptoms. Visual inspection of sub-group means indicated that biases towards threat might have been greater in high-

symptomatic burns survivors, relative to low-symptomatic burns patients and controls. Furthermore, visual inspection of means for low-symptomatic burns survivors suggested a trend involving a memory bias against trauma passages relative to the other two subgroups. This could be consistent with the proposal of premature inhibition of emotional processing in trauma survivors (Brewin et al 1996). However, all of these apparent patterns could have emerged by chance.

4.5.2 Do burns survivors show general memory deficits in association with posttraumatic symptoms?

In accordance with predictions, the burn-injured group had inferior recall overall compared to the control group. Exclusion of two burn survivors with outlying Audit scores suggested that this was not due to higher levels of alcohol use in burn-injured group. The overall recall advantage for controls also did not appear to be due to differences in intelligence levels because groups were matched for years of education. However, a more reliable estimate of intelligence would be required to exclude this possibility. Crawford et al (1990) developed an appropriate technique, which employs a regression equation to predict NART error scores (Nelson 1982) from demographic variables. However, this approach could not be applied because social class status was not assessed. In addition, only control individuals provided self-reports with respect to medical histories. Memory deficits in burns survivors could therefore be a product of undetected medical factors such as a history of head trauma. Such issues and current medication use should be assessed more thoroughly in the future.

Visual inspection of the overall recall advantage for control individuals suggested that the effect was greater in comparisons against high-symptomatic burns survivors as opposed to low-symptomatic burns participants. These findings could be consistent with studies reviewed by Buckley et al (2000), which suggested that auditory immediate recall might be generally impaired in individuals with posttraumatic symptoms.

4.5.3 The impact of behavioural avoidance, and clinical implications of study findings.

Burns survivors who volunteered a reason for not participating stated that they were concerned about the potential stressfulness of the tasks. Moreover, some burns participants indicated that they would have disengaged from trauma passages if they encountered them during normal activities. It may be therefore that in naturalistic situations posttraumatic symptoms are maintained by a memory bias against threat resulting from behavioural (and possibly cognitive) avoidance of trauma-related exposure. According to the vigilance-avoidance hypothesis this could impact on objective evaluation and/or habituation to trauma-related material. However, visual inspection of memory bias patterns suggested that symptoms may also be maintained by trauma-related processing biases towards threat that operate automatically when exposure is unavoidable, exaggerating a sense of serious current threat (Ehlers & Clark 2000).

McNally (1995) argued that if anxious individuals generally encode threat-related material automatically, then associated processing biases might be most appropriately addressed through exposure. Cognitive therapy would, however, remain beneficial in

facilitating engagement in exposure and in resolving problematic trauma-related appraisals. Yet, processing biases towards threat may repeatedly undermine these approaches and need to be taken into account.

4.5.4 Is it feasible to investigate patterns of memory bias in a trauma population using prose passages?

The prose passage approach appeared to be acceptable for trauma survivors. Transient stress evoked in individuals with the most posttraumatic symptoms and burn experiences similar to passage content, quickly dissipated. This information could be used to alleviate concerns and hence to facilitate future recruitment.

A focus on common sensory and emotional reactions to burns appears to have been relatively successful in creating salient material. However, minimal emotional responses in some individuals may explain the absence of significant memory bias effects. This could have been partially addressed by only recruiting individuals with burn types matching passage content but this would reduce the generalisability of findings.

4.5.5 Further recommendations regarding future research and methodological issues

This study should be extended to investigate trauma survivors' anticipatory anxiety relating to trauma passages and associated avoidant tendencies. A larger sample could be employed to explore the potential association between posttraumatic symptoms and memory bias for trauma-related material. Recall means for high-symptomatic

burns survivors and low-symptomatic healthy controls provide a basis for a more suitable power calculation than was available for this study.

Memory bias effects might be more apparent if a burn-injured group consisted only of individuals with diagnostic levels of PTSD, assessed thorough a clinician-administered structured interview. A trauma group without posttraumatic symptoms could be employed to control for familiarity effects arising from trauma exposure. However, careful consideration would need to be given to potentially confounding memory bias patterns predicted for premature inhibitors (Brewin et al 1996) (see appendix 4x for further discussion).

Some control participants reported subclinical posttraumatic, anxious and depressive symptoms, which may have contributed to similarities in memory bias patterns across groups. Psychiatric and non-anxious/non-depressed control groups could have been employed to separate out effects of anxiety and depression. However, the control group employed in this exploratory study was more representative of the 'normal' population.

Litz et al (1996) suggested that extending the interval between encoding and retrieval might allow for more elaboration/rumination associated with intrusive encoding or more avoidance/suppression associated with avoidant encoding. This could facilitate future detection of proposed memory bias effects.

Trauma passages had greater emotional content than neutral passages, which could have impacted on memory bias effects. Positive and negative emotional material could be employed to control for this factor (Paunovic et al 2002).
(see appendix 4y for supplementary discussion points).

Finally, recommendations are available from the authors involving modifications to passages to improve assessment of recall and to allow greater precision in the assessment of prose stress and salience (see appendix 4z).

4.6 Reference List

American Psychiatric Association (1994). *Diagnostic and Statistical Manual of Mental Disorders (4th ed.)* Washington DC: American Psychiatric Association.

Babor, T. F., de la Fuente, J. R., Saunders, J., Grant, M. (1989) *AUDIT: The Alcohol Use Disorders Identification Test: Guidelines for use in primary health care.* 1st edition. World Health Organization, Geneva, Switzerland

Babor, T. F., de la Fuente, J. R., Saunders, J., Grant, M. (2001) *AUDIT: The Alcohol Use Disorders Identification Test: Guidelines for use in primary health care.* 2nd edition. World Health Organization, Geneva, Switzerland

Beck, A.T. et al (1979) *Cognitive therapy of depression: A treatment manual.* New York: Guildford.

Beck, A.T. et al (1985) *Anxiety disorders and phobias: A cognitive perspective.* New York: Basic Books.

Bramley, P. N. et al (1988). The differentiation of anxiety and depression by rating scales. Acta Psychiatrica Scandinavica. Vol 77(2) Feb 1988, 133-138.

Breslau N, Davis GC, Andreski P & Peterson EL (1991) Traumatic events and posttraumatic stress disorder in an urban population of young adults. *Archives of General Psychiatry. 48 pp.216-222.*

Breslau, N., Kessler, R. C., Chilcoat, H. D., Schultz, L. R., Davis, G. C., & Andreski, P. (1998) Trauma and posttraumatic stress disorder in the community. *Archives of General Psychiatry, 55, pp. 626-632.*

Buckley, T.C. et al (2000) Information Processing and PTSD: A review of the empirical literature. *Clinical Psychology Review. 28, pp. 1041-1065.*

Bryant, R.A. (1996) Predictors of post-traumatic stress disorder following burns injury. *Burns*;22:89-92.

Cohen, J. (1988) *Statistical power analysis for the behavioural sciences.* (2nd edition) New York: Academic Press.

Cohen, J. (1992) A power primer. *Psychological Bulletin, 112(1), pp. 155-159*

Coles, M.E. & Heimberg, R.G. (2002) Memory bias in the anxiety disorders: Current status. *Clinical Psychology Review, Vol. 22(4), pp. 587-627.*

Crawford, J. R., Allan, K. M., Cochrane, R. H. B., & Parker, D. M. (1990). Assessing the validity of NART-estimated premorbid IQs in the individual case. *British Journal of Clinical Psychology, 29*, pp. 435–436.

Creamer, M., Bell, R. & Failla, S. (2003) Psychometric properties of the Impact of Event Scale – Revised. *Behaviour research and Therapy 41 pp. 1489-1496*

Ehlers, A. & Clark, D. M.(2000) A cognitive model of posttraumatic stress disorder. *Behaviour and Research Therapy. 38, pp. 319-345.*

Field, A (2005) *Discovering Statistics Using SPSS* (2nd Edition). Sage Publications Ltd

Foa, E.B. & Kozak, M.J. (1986) Emotional processing of fear: exposure to corrective information. *Psychological Bulletin 99 pp. 20-35.*

Flesch, R. (1948) "A New Readability Yardstick" *Journal of Applied Psychology, 32 (3)* *p. 221 - 233*

Foa, E.B. (1995). *Posttraumatic Stress Diagnostic Scale (manual).* Minneapolis, MN: National Computer Systems.

Kessler, R. C., et al (1995). Posttraumatic stress disorder in the National Comorbidity Survey. *Archives of General Psychiatry* 52, p. 1048-1060.

Litz, B. T. et al (1996) Attention, Arousal, and Memory in Posttraumatic Stress Disorder. *Journal of Traumatic Stress, Vol. 9, No.3 pp. 497-519.*

Litz, B.T. & Keane, T.M. (1989) Information processing in anxiety disorders: Application to the understanding of posttraumatic stress disorder. *Clinical Psychology Review,* 9 pp.243-257.

McDonald, A.S. & Davey, G.C.L. (1996) Psychiatric disorders and accidental injury. *Clinical Psychology Review. Vol 16(2) 105-127.*

McNally, R. J. et al (1998) Directed Forgetting of Trauma Cues in Adult Survivors of Childhood Sexual Abuse With and Without Posttraumatic Stress Disorder. *Journal of Abnormal Psychology, Vol. 107, No. 4 pp. 596-601.*

Mogg, K.et al (1987). Memory bias in clinical anxiety. *Journal of Abnormal Psychology, 96*, 94–98.

Nelson, H. E. (1982). *National Adult Reading Test (NART): Test Manual.* Windsor: NFER-NELSON.

Patterson D.R. et al (1990). Post-traumatic stress disorder in hospitalized patients with burn injuries. *Journal of Burn Care Rehabilitation* 1990;11:181-184.

Paunovic, N. et al (2002) Attentional and memory bias for emotional information in crime victims with acute posttraumatic stress disorder (PTSD). *Journal of Anxiety Disorders 16, pp. 675-692.*

Paunovic, N. et al (2003) Memory Bias for Faces that are Perceived as Hostile by Crime Victims with Acute Post-traumatic Stress Disorder. *Cognitive Behaviour Therapy vol 32, No.4 pp. 203-214.*

Rachman, S. (1980) Emotional processing. *Behaviour Research and Therapy 18, pp. 51-60.*

Rapee, R et al. (1994). Memory bias in social phobia. *Behaviour Research and Therapy, 29*, 317–323.

Resnick HS, Kilpatrick DG, Dansky BS, Saunders BE & Best CL (1993) Prevalence of civilian trauma and posttraumatic stress disorder in a representative national sample of women. *Journal of Consulting and Clinical Psychology 61 pp. 984-991.*

Resick, P.A. & Calhoun, K.S. (2001) Posttraumatic Stress Disorder. In D.H. Barlow (Ed) *Clinical Handbook of Psychological Disorders – a step-by-step treatment manual. 3rd Ed.* The Guidlford Press. Chp. 2 pp. 68.

Rothbaum, B.O. & Foa, E.B. (1993) Subtypes of posttraumatic stress disorder and duration of symptoms. In J.R.T. Davidson & E.B. Foa (Eds) *Posttraumatic stress disorder: DSM-IV and beyond.* (pp.23-35). Washington DC, American Psychiatric Press.

Saunders, J.B. et al (1993) Development of the Alcohol Use Disorders Identification Test (AUDIT): WHO Collaborative Project on Early Detection of Persons with Harmful Alcohol Consumption--II. *Addiction. 88(6):791-804.*

Stouffer, D.G. (1994) *Journeys Through Hell: Stories of Burns survivors' Reconstruction of Self and Identity.* Rowman & Littlefield Publishers.

Tabachnick, B. & Fidell, L.S. (2001) *Using multivariate statistics – 4th edition.* Allyn & Bacon

Tedstone, J. E. & Tarrier, N. (1997) An investigation of the prevalence of psychological morbidity in burn-injured patients. *Burns*, 23, 550-54.

Vrana, S.R. et al (1995) Selective Processing of Trauma-Relevant Words in Posttraumatic Stress Disorder. *Journal of Anxiety Disorders, Vol. 9, No.6 pp.515-530.*

Weiss, D.S. & Marmar, C. R. (1997) The Impact of Events Scale - Revised. In J.P. Wilson & T.M. Keane (Eds), "*Assessing psychological trauma and PTSD*". p. 399 - 411. New York: Guildford Press.

Wenzel, A. & Holt, C.S. (2002) Memory bias against threat in social phobia British Journal of Clinical Psychology Vol 41, Part 1, p. 73- 79.

Weschler, D. (1997) *Weschler Memory Scale - 3rd Edition* San Antonio TX: Psychological Corporation

Williams, J.M.G. et al (1988) *Cognitive psychology and the emotional disorders.* Chichester, UK: Wiley.

Williams, J.M.G. et al (1997) *Cognitive psychology and emotional disorders* (2nd ed.) Chichester, UK: John Wiley.

Zeitlin, S. B. & McNally, R. J. (1991) Implicit and Explicit Memory Bias for Threat in Post-traumatic Stress Disorder. *Behaviour Research and Therapy. Vol. 29, No. 5 pp. 451-457.*

Zigmond AS, Snaith RP. (1983) The Hospital Anxiety and Depression Scale. *Acta Psychiatrica Scandinavia* 67:361-370.

Zoellner, L. A. et al (2003) Directed Forgetting Following Mood Induction in Chronic Posttraumatic Stress Disorder Patients. *Journal of Abnormal Psychology 2003, Vol. 112, No.3, pp. 508-514.*

Chapter 5 Single n Case Study

Trainee: Stephen Marks

Research Supervisor: Dr Elizabeth Campbell

Submitted in part fulfilment of the degree of Doctorate in Clinical Psychology at the University of Glasgow.

Written in the style of "The Journal of Mental Health"

(see Appendix)

Word count: 4875

An investigation of the effectiveness of applied tension in the treatment of chronic blood-injury-injection phobia in an individual with a chronic medical health condition and concurrent mental health problems.

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5.1 An investigation of the effectiveness of applied tension in the treatment of chronic blood-injury-injection phobia in an individual with a chronic medical health condition and concurrent mental health problems.

Abstract

Background: Blood-injury-injection (BII) phobia is a specific phobias where fear is cued by "seeing blood or an injury or by receiving an injection or other invasive medical procedure" (APA, 1994). There is a high prevalence of fainting with exposure mediated by a vasovagal response involving a sudden lowering of blood pressure. Associated distress can significantly complicate medical treatments.

Aims: This single case study aimed to employ constructed films to evoke a mild vasovagal response in a BII phobic with a chronic medical health difficulty and to investigate the effectiveness of a technique termed "applied tension".

Method: The patient was presented with a BII film using an ABAB design, with exposure and applied tension phases. Changes in blood pressure, faint-related sensations and associated emotions and cognitions were evaluated.

Results: Applied tension, in combination with exposure, resulted in statistically significant reductions in self-reported vasovagal symptoms and associated emotions. Clinically relevant changes in systolic blood pressure, anxiety and cognitions related to fainting and treatment were also apparent.

Conclusions: Applied tension, in combination with exposure, appears to be an effective technique for managing vasovagal symptoms associated with BII phobia. Recommendations regarding the use of this technique are discussed.

Keywords Blood-injury-injection phobia, applied tension, vasovagal, Interrupted Time Series Analysis

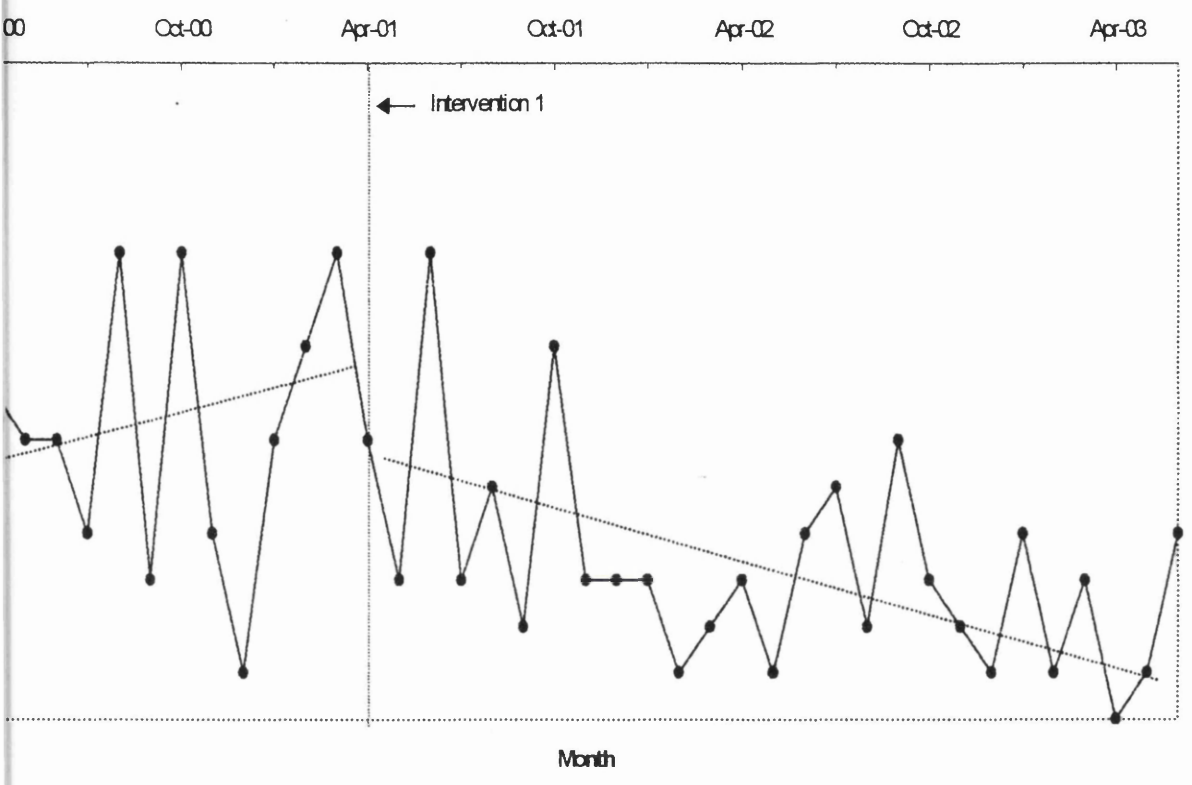
Appendices

Appendix 1 Tables, figures and appendices Small Scale Research Project

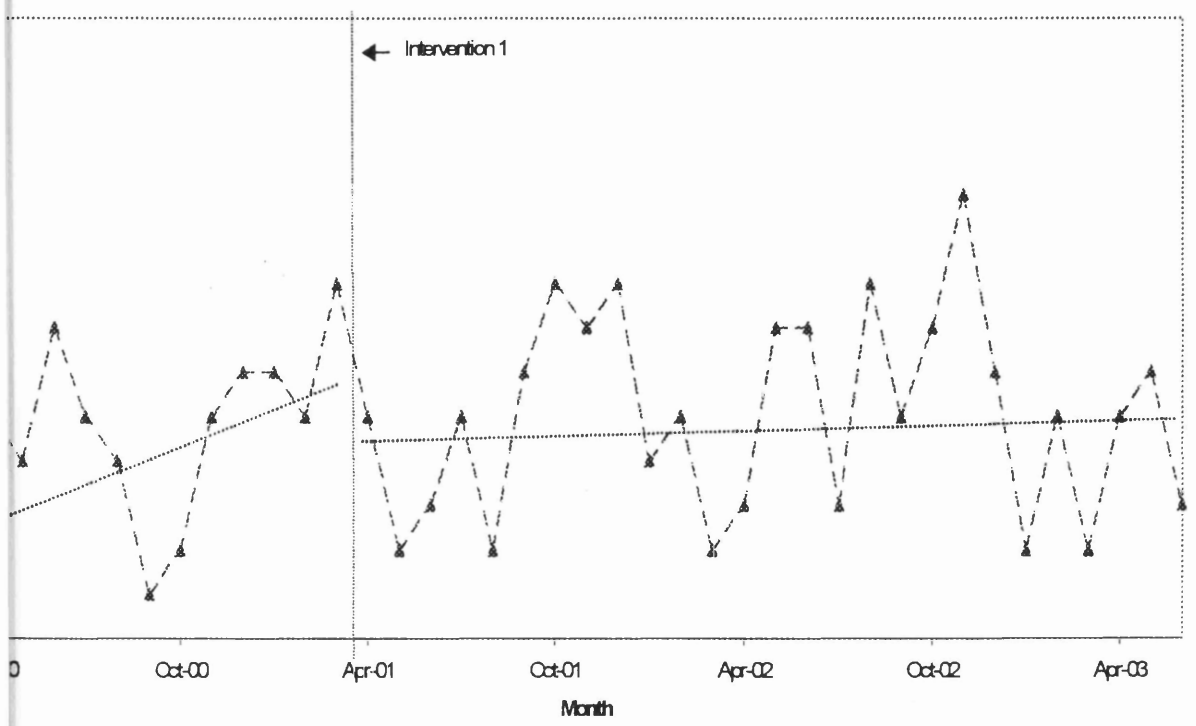
and inter-quartile ranges for all groups during the time span of the project. In each case figures are presented for pre and post-intervention phases and for the complete study period. Relevant dates and durations of phases are also provided. Section a) refers to practices receiving Intervention 1 and section c) to those receiving Intervention 2. Section b) presents similar figures for the Control Group of practices but separates summary statistics for Intervention 1 phases (section b) i)) from descriptives relevant to Intervention 2 phases (section b) ii)).

a) Nurse Intervention 1 Practices	**Number of referrals**	**Median monthly referral rate**	**Range**	**Inter-Quartile Range**
Pre-intervention 1 - April 2000 to March 2001 (12 months)	75	6	1 - 10	4 - 8.5
Post-intervention 1 - April 2001 to June 2003 (27 months)	89	3	0 - 10	2 - 4
All referrals - April 2000 to June 2003 (39 months)	164	3	0 - 10	2 - 6
b) Control Group Practices	**Number of referrals**	**Median monthly referral rate**	**Range**	**Inter-Quartile Range**
i) Pre-intervention 1 - April 2000 to March 2001 (12 months)	58	5	1 - 8	4 - 6
Post-intervention 1 - April 2001 to June 2003 (27 months)	136	5	2 - 10	3 - 7
ii) Pre-intervention 2 - April 2000 to September 2002 (30 months)	148	5	1 - 8	3.25 - 6.75
Post-intervention 2 - October 2002 to June 2003 (9 months)	46	5	2 - 10	3 - 6
iii) All referrals - April 2000 to June 2003 (39 months)	194	5	1 - 10	3 - 6.5
c) Nurse Intervention 2 Practices	**Number of referrals**	**Median monthly referral rate**	**Range**	**Inter-Quartile Range**
Pre-intervention 2 referrals - April 2000 to September 2002 (30 months)	149	5	0 - 10	3.25 - 7
Post-intervention 2 referrals - October 2002 to June 2003 (9 months)	22	2	0 - 7	1 - 3
All referrals - April 2000 to June 2003 (39 months)	171	4	0 - 10	2.5 - 6.5

Figure 1.1: Number of referrals to Clinical Psychology per month, for Intervention 1 practices (upper portion) and Control Group practices (lower portion), from April 2000 to June 2003. Graphs are divided into pre and post intervention 1 phases with lines of best fit plotted for each phase.

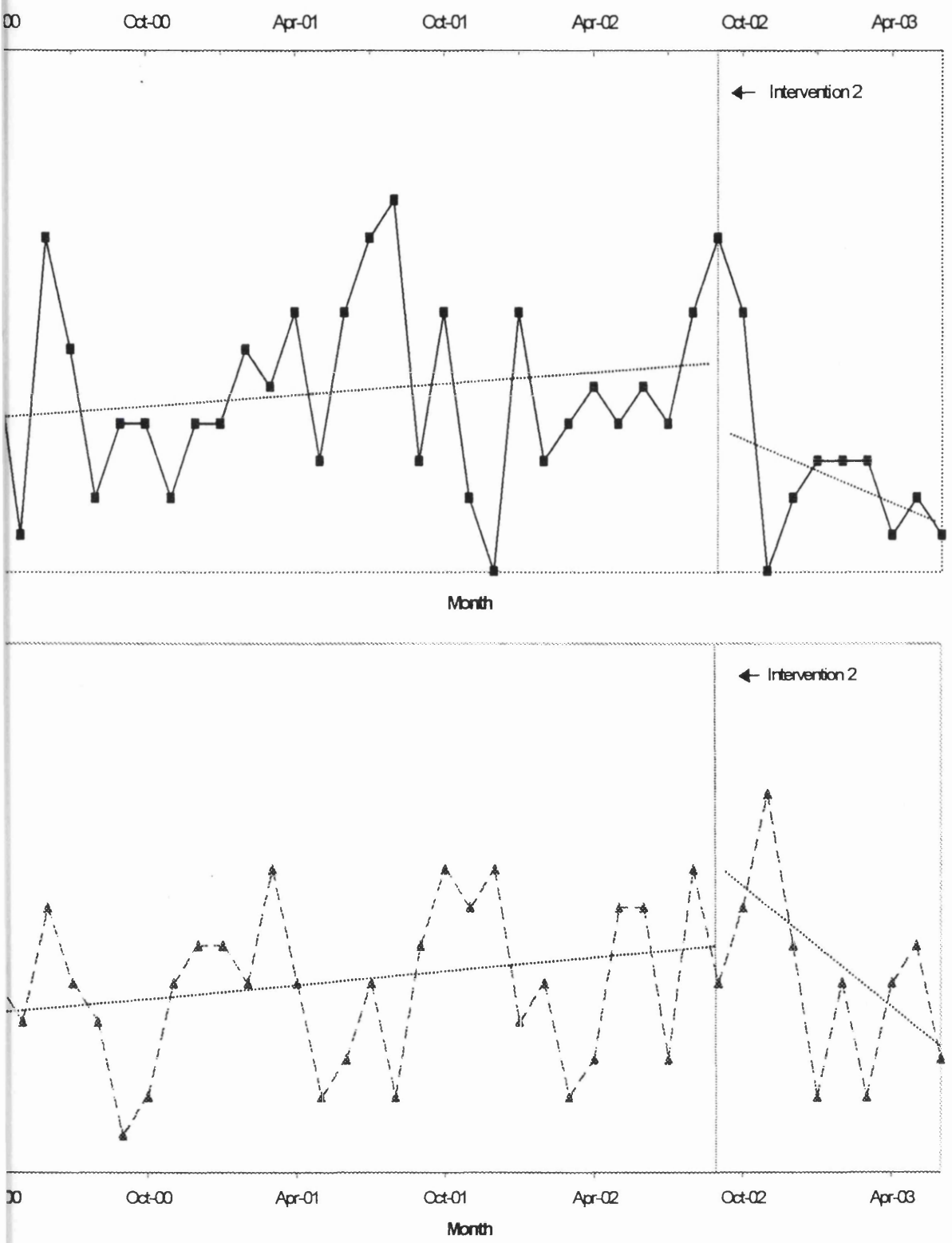


Intervention 1 Group



Control Group

Figure 1.2: Number of referrals to Clinical Psychology per month, for Intervention 2 practices (upper portion) and Control Group practices (lower portion), from April 2000 to June 2003. Graphs are divided into pre and post intervention 1 phases with lines of best fit plotted for each phase.



Intervention 2 Group

Control Group

Table 1.2: Table 1.2 presents slopes and intercepts and results of F-tests and t-tests for ITSA for all groups during the time span of the project. Column a) refers to practices receiving Intervention 1 and column c) to those receiving Intervention 2. ITSA figures for the control Group are reported in column b) with respect to Intervention 1 phases and column d) with respect to Intervention 2 phases.

		a) Intervention 1 Group	b) Control Group during Intervention 1	c) Intervention 2 Group	d) Control Group during Intervention 2
Intercept	**Phase 1**	5.51	3.21	4.14	4.25
	Phase 2	5.30	4.71	3.61	8.02
Slope	**Phase 1**	0.11	0.27	0.05	0.04
	Phase 2	-0.14	0.02	-0.26	-0.56
Overall change		F (2, 34) = 0.98, p = 0.386	F (2, 34) = 0.44, p = 0.646	F (2, 34) = 2.49, p = 0.098	F (2, 34) = 1.36, p = 0.271
Change in intercept		t (34) = -0.12, p = 0.906	t (34) = 0.65, p = 0.523	t (34) = -0.24, p = 0.813	t (34) = 1.54, p = 0.134
Change in slope		t (34) = -1.35, p = 0.186	t (34) = -0.87, p = 0.388	t (34) = -0.80, p = 0.431	t (34) = -1.63, p = 0.113

Appendix 1a: Contributor's Page Journal of Mental Health

Journal of Mental Health is an international journal adhering to the highest standards of anonymous, double-blind peer-review. The journal welcomes original contributions with relevance to mental health research from all parts of the world. Papers are accepted on the understanding that their contents have not previously been published or submitted elsewhere for publication in print or electronic form. **Evaluation Criteria of Qualitative Research Papers**.

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The reference list should begin on a separate page, in alphabetical order by author (showing the names of *all* authors), in the following standard forms, capitalisation and punctuation:

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Powell, T.J. & Enright, S.J. (1990) *Anxiety and Stress management* . London: Routledge

c) For chapters within multi-authored books:

Hodgson, R.J. & Rollnick, S. (1989) More fun less stress: How to survive in research. In G.Parry & F. Watts (Eds.), *A Handbook of Skills and Methods in Mental Health Research* (pp. 75–89). London:Lawrence Erlbaum.

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Appendix 1b Anonymised Data Record Sheet

GP	Group	Apr-00	May-00	Jun-00	Jul-00	Aug-00	Sep-00
1	1						
2	1						
3	1						
4	1						
5	1						
6	1						
7	1						
8	1						
9	1						
10	1						
11	1						
12	1						
Total							
1	2						
2	2						
3	2						
4	2						
5	2						
6	2						
7	2						
8	2						
9	2						
10	2						
11	2						
12	2						
13	2						
Total							
1	3						
2	3						
3	3						
4	3						
5	3						
6	3						
7	3						
8	3						
9	3						
10	3						
11	3						
12	3						
Total							

Appendix 1c Clinical Psychology published waiting times

Month	Published waiting time (weeks)
Apr-00	20
May-00	20
Jun-00	20
Jul-00	22
Aug-00	22
Sep-00	22
Oct-00	22
Nov-00	22
Dec-00	22
Jan-01	22
Feb-01	22
Mar-01	22
Apr-01	22
May-01	22
Jun-01	22
Jul-01	22
Aug-01	22
Sep-01	22
Oct-01	22
Nov-01	22
Dec-01	26
Jan-02	26
Feb-02	26
Mar-02	26
Apr-02	26
May-02	26
Jun-02	26
Jul-02	26
Aug-02	26
Sep-02	26
Oct-02	26
Nov-02	26
Dec-02	26
Jan-03	26
Feb-03	26
Mar-03	26
Apr-03	26
May-03	26
Jun-03	26

Appendix 2 Tables and appendices Systematic Review

Table 2.1: Description of methodologies for each study included in the systematic review

Author / date	Groups	Study task	Stimuli and control stimuli
Dalglesih et al (2003)	Children and adolescents with PTSD, depression, GAD and healthy controls.	Free recall task	Trauma, threat, and depression-related words, and positive emotional and neutral words
Litz et al (1996)	3 groups of Vietnam veterans: individuals with PTSD, well-adjusted controls (WELL), and psychiatric controls (PSYCH).	Modified emotional stroop task followed by recognition task.	High and low-threat words related to military experience in military words and education words.
McNally et al (1998)	Adult survivors of CSA with and without PTSD and healthy controls without trauma	Directed forgetting paradigm followed by recall test.	Trauma, positive and neutral words.
McNally et al (2001)	Women reporting repressed or recovered memories of childhood sexual abuse (CSA) and women with no experience of CSA.	Directed forgetting paradigm, followed by recall.	Trauma, positive and neutral words
Moradi et al (2000)	Children and adolescents with PTSD and healthy controls without trauma.	Free recall and recognition tasks	Positive, neutral, trauma-related, threat-related and depression-related words
Paunovic et al (2002)	Crime victims with acute PTSD and healthy controls without trauma.	Modified emotional stroop and tachistoscopic identification task, followed by free recall.	Trauma, neutral and positive words
Paunovic et al (2003)	Crime victims with acute PTSD and healthy controls without trauma	Face recognition	Photographs of unfamiliar faces, which participants rated as hostile, non-hostile and undecided.

Author / date	Groups	Study task	Stimuli and control stimuli
Vrana et al (1995)	Vietnam veterans with and without PTSD.	Modified emotional stroop task followed by free recall and recognition tasks.	Neutral words, emotionally negative words, Vietnam-specific words, Vietnam-general words.
Zeitlin & McNally (1991)	Vietnam veterans with and without PTSD	Cued recall task following elaborative and non-elaborative encoding.	Combat-related, social threat, positive and neutral words.
Zoellner et al (2003)	Female assault victims with PTSD and healthy controls without trauma.	Directed forgetting paradigm after inducing serenity or dissociation, followed by recall and recognition tasks.	Threat-related, positive and neutral words

Table 2.2: Ratings of methodological quality overall and for sub-sections of the rating form for each study included in the systematic review

Author / date	Quality rating form sub-section ratings					Overall quality rating (max. 47.5)
	Sampling (max score 13)	Characteristics main study group (max. 8.5)	Characteristics of control groups (max 11.5)	Administration and nature of encoding task(s) (and retrieval task(s)) (max. 10.5)	Analysis (max. 1)	
Dalglesih et al (2003)	12	4.5	6.5	8.5	2	34.5
Litz et al (1996)	10	8.5	6.5	9.5	4	38.5
McNally et al (1998)	7.5	8.5	6	8.5	4	34.5
McNally et al (2001)	8	7	6	8.5	4	33.5
Moradi et al (2000)	12	8.5	5.5	7.5	2	35.5
Paunovic et al (2002)	11.5	8.5	5	8	4	37
Paunovic et al (2003)	9.5	8.5	4	7.5	4	33.5
Vrana et al (1995)	10	8.5	3.5	9.5	3	34.5
Zeitlin & McNally (1991)	8.5	6.5	5.5	9	4	34
Zoellner et al (2003)	9	8.5	4.5	8.5	4	34.5

Description
Journal of Anxiety Disorders is an interdisciplinary journal that publishes research papers dealing with all aspects of anxiety disorders for all age groups (child, adolescent, adult and geriatric). Areas of focus include: traditional, behavioral, cognitive and biological assessment; diagnosis and classification; psychosocial and psychopharmacological treatment; genetics; epidemiology; and prevention. Theoretical and review articles will be considered for publication if they contribute substantially to current knowledge in the field. The journal also contains sections for clinical reports (single-case experimental designs and preliminary but innovative case series) and book reviews on all aspects of anxiety disorders.

Guide for Authors

SUBMISSION REQUIREMENTS: Manuscripts and all correspondence should be submitted to Michel Hersen, Ph.D., Co-Editor-in-Chief, Journal of Anxiety Disorders, School of Professional Psychology, Pacific University, 2004 Pacific Avenue, Forest Grove, OR 97116, USA. Submit three (3) high-quality copies (clean, readable, on good quality paper in English) of the completed manuscript; the original is not required. Allow ample margins and type DOUBLE-SPACED throughout. One of the paper's authors should enclose a letter to the Editor, requesting review and possible publication; the letter must also state that the manuscript has not been previously published and has not been submitted elsewhere. Please supply the corresponding author's phone and FAX numbers and E-mail address, if available (as well as any upcoming address change). This individual will receive editorial correspondence from the Editor.

Manuscripts submitted will be reviewed by at least two editorial consultants. Papers accepted for *Journal of Anxiety Disorders* may not be published elsewhere in any language without written permission from the author(s) and publisher. Upon acceptance for publication, the author(s) must complete a Transfer of Copyright Agreement form.

COMPUTER DISKS: Authors are encouraged to submit a computer disk (5.25" or 3.5" HD/DD disk) containing the final version of the paper along with the final manuscript to the editorial office. Please observe the following criteria: 1. Send only hard copy when first submitting your paper; 2. When your paper has been refereed, revised if necessary and accepted, send a disk containing the final version with the final hard copy. Make sure that the disk and the hard copy match exactly; 3. Specify what software was used, including which release, e.g., WordPerfect 6.0; 4. Specify what computer was used (either IBM compatible PC or Apple Macintosh); 5. The article file should include all textual material (text, references, tables, figure captions, etc.) and separate illustration files, if available. 6. The file should follow the general instructions on style/arrangement and, in particular, the reference style of this journal as given in the Instructions to Authors; 7. The file should be single spaced and should use the wrap-around end-of-line feature, i.e. no returns at the end of each line. All textual elements should begin flush left; no paragraph indents. Place two returns after each element such as title, headings,

paragraphs, and figure and table call-outs; 8. Keep a back-up disk for reference and safety.

TITLE PAGE: The title page should list (1) the article; (2) the authors; names, degrees, and affiliations at the time the work was conducted; (3) a concise running title; (4) an unnumbered footnote giving address for reprint requests and correspondence; and (5) four to six keywords. Keywords should be selected from the APA list of index descriptors, unless otherwise approved by the Editor.

ABSTRACT: An abstract should be submitted that does not exceed 150 words in length. This should be typed on a separate page following the title page.

STYLE AND REFERENCES: Manuscripts should be carefully prepared using the *Publication Manual of the American Psychological Association*, 5th ed., 1994, for style. The reference section must be DOUBLE-SPACED and all works cited must be listed. Avoid abbreviations of journal titles and incomplete information.

Reference Style for Journals:

Raymond, M.J. (1964). The treatment of addiction by aversion conditioning with apomorphine. *Behaviour Research and Therapy*, **3**. 287-290.

For Books:

Barlow, D.H., Hayes, S.C., & Nelson, R.O. (1984). *The scientist practitioner*: *Research and accountability in clinical and educational settings*. New York: Pergamon Press.

TABLES AND FIGURES: Do not send glossy prints, photographs, or original artwork until acceptance. Copies of all tables and figures should be included with each copy of the manuscript. Upon acceptance of a manuscript for publication, original camera-ready photographs and art work must be submitted, unmounted and on glossy paper. Photocopies, blue ink, or pencil are not acceptable. Use black india ink and type figure legends on a separate sheet. Write the article title and figure number lightly in pencil on the back of each.

PAGE PROOFS AND REPRINTS: Page proofs of the article will be sent to the corresponding author. These should be carefully proofread. Except for typographical errors, corrections should be minimal, and **rewriting the text is not permitted.** Corrected page proofs must be returned within 48 hours of receipt to the Journals Production Department of Pergamon. Along with page proofs, the corresponding author will receive a form for ordering reprints and full copies of the issue in which the article appears. Twenty-five (25) free reprints are provided; orders for additional reprints must be received before printing in order to qualify for lower publication rates. All co-author reprint requirements should be included on the reprint order form.

Personal Account Name: **glam3marks001**

#	Search History		Results	Displ
1	trauma.ab,ti.	Details	177982	DISP
2	PTSD.ab,ti.	Details	17230	DISP
3	traumatic stress.ab,ti.	Details	9348	DISP
4	post traumatic stress.ab,ti.	Details	7781	DISP
5	posttraumatic stress.ab,ti.	Details	17115	DISP
6	1 or 2 or 3 or 4 or 5	Details	196222	DISP
7	memory.ab,ti.	Details	207466	DISP
8	recall.ab,ti.	Details	60531	DISP
9	bias.ab,ti.	Details	77501	DISP
10	7 or 8	Details	244962	DISP
11	9 and 10	Details	4268	DISP
12	"cognitive avoidance".ab,ti.	Details	331	DISP
13	"avoidant encoding".ab,ti.	Details	10	DISP
14	"memory deficit".ab,ti.	Details	2396	DISP
15	"recall deficit".ab,ti.	Details	101	DISP
16	11 or 12 or 13 or 14 or 15	Details	7041	DISP
17	"recognition task".ab,ti.	Details	3301	DISP
18	16 or 17	Details	10265	DISP
19	"semantic processing".ab,ti.	Details	2122	DISP
20	18 or 19	Details	12333	DISP
21	6 and 20	Details	168	DISP
22	remove duplicates from 21	Details	101	DISP Revis Duplica
23	limit 22 to english	Details	92	DISP
24	limit 23 to human [Limit not valid in: CINAHL,Ovid MEDLINE(R) In-Process & Other Non-Indexed Citations; records were retained]	Details	86	DISP
25	limit 24 to "0800 empirical study" [Limit not valid in: CINAHL,EMBASE,Ovid MEDLINE(R) In-Process & Other Non-Indexed Citations,Ovid MEDLINE (R); records were retained]	Details	75	DISP
26	limit 25 to journal article [Limit not valid in: EMBASE; records were retained]	Details	62	DISP
27	from 26 keep 2, 5, 7, 9-10, 15-19, 21-22...	Details	30	DISP
28	**from 27 keep 1, 3-6, 8-9, 11, 13-15, 19-24...**	Details	**20**	**DISP**

Appendix 2c Data extraction table – Systematic Literature Review *(questions in italics were not included in the analysis of quality ratings)*

Title of paper:

Year:

Author(s):

Brief description of aims/hypotheses in relation to assessment of memory bias and any contextually related aims/hypotheses:

For all questions below please circle the appropriate response and write in additional comments as necessary. If two responses are appropriate, allocate the highest score on the question.

1) Sampling

a) Is the study's sampling method clearly described?
2 Yes 1 Not fully/clearly described 0 not described

b) What type of sample was used as the main study group? (please specify this group)
1.5 Random, 1 Sample of convenience (e.g. individuals attending a clinic),
0.5 Request for volunteers 0 Not specified .....

c) What type of sample was used in the control group(s)?
1.5 Random, 1 Sample of convenience (e.g. individuals attending a clinic),
0.5 Request for volunteers 0 Not specified

d) *Is the sample size reported? (Please specify)*
1 Yes 0 No

e) Are inclusion criteria adequately described?
2 Adequately described 1 Described inadequately 0 Not described

f) Are exclusion criteria adequately described?
2 Adequately described 1 Described inadequately 0 Not described

g) Were the following characteristics of the main study population (i.e. the PTSD group or main trauma group) adequately described? (Please describe under each heading)?

(i) Gender 1 Yes 0 No
Males.....Females.....
(ii) Age 1.5 Mean and s.d. 1 Mean and other measure of spread
0.5 Mean only 0 Not adequately described .....
(iii) Assessed intelligence level
1.5 By standardised intelligence test 1 By Non-standardised intelligence test
0.5 By years of education 0 Not assessed or not adequately described...

2) Clinical characteristics (main study population)

a) How were clinical conditions assessed?.....

3 Clinician-administered diagnostic interview
2.5 Unqualified-clinician-administered diagnostic interview (e.g. doctoral trainee, phD student, trained administrator)
2 Clinician administered interview and self-report checklist
1.5 Clinician administered interview
1.5 Clinician-administered self-report checklist
1 Unqualified-clinician-administered self-report checklist,
0.5 Self-report symptom checklist
0 Unspecified 0 Not assessed 0 Not reported

b) Was assessment independent/blind to study hypotheses?
1 Yes 0 Unspecified 0 No

c) Are the assessment tools used generally considered reliable and valid? (disregard tools used to assess comorbidity) (please write down tools used)
2 Yes strong support 1 Yes limited evidence 0 Weak or no evidence
.....
.....

d) Was symptom severity assessed and reported?
2 Yes, assessed through standardised instruments.
1 Yes, assessed through non-standardised instruments or only partly assessed/reported
0 Not specified

e) Was comorbidity assessed and reported? (Please write down comorbid conditions assessed and tools used.)
2 Yes, assessed through standardised instruments.
1 Yes, assessed through non-standardised instruments.
0 Not specified
.....
.....
.....

3) Characteristics of control group(s)

a) Which groups were included in the study?

	Yes No (no scores)
(i) Clinical trauma group (e.g. Vietnam veterans with PTSD)	
(ii) Non-clinical trauma group (e.g. Vietnam veterans without PTSD)	1 Yes 0 No
(iii) Clinical control(s) group (e.g. anxious or depressed)	1 Yes 0 No
(iv) Non-clinical control group without trauma	1 Yes 0 No

(please describe each group included in the study (as above examples)
.....
.....

b) Were the inclusion and exclusion criteria equally applied to all groups?
2 Equally applied to all groups 1 Some criteria equally applied
0 Not specified 0 Unequally applied

c) Was the non-clinical trauma group matched to the study group for trauma exposure?
1 Yes or controlled for in later analysis 0 Unspecified
0 No or no non-clinical trauma control

d) Was the non-clinical trauma group(s) matched to the study group for comorbidity?
1.5 Yes 1 Not matched but comorbidity was controlled for in later analysis
0.5 Differences in comorbidity reported but not considered in analysis
0 Comorbidity in this group not reported
0 Comorbidity in this group not assessed
0 No non-clinical trauma group

e) Was the clinical control group(s) matched to the study group for the disorder that it is intended to control for (e.g. assessed anxiety)?
1.5 Yes 1 Not matched but comorbidity was controlled for in later analysis
0.5 Differences in comorbidity reported but not considered in analysis
0 Comorbidity in this group not reported
0 Comorbidity in this group not assessed
0 No clinical control group

f) Were there equal numbers of participants in control groups compared to the main study group? (please specify) 1 Yes 0 No 0 Unspecified
.....
.....

g) Were groups matched for demographic factors or were factors later entered as covariants?

(i) Age	0.5 Yes	0 No	0 Unspecified
(ii) Gender	0.5 Yes	0 No	0 Unspecified
(iii) Intelligence	0.5 Yes	0 No	0 Unspecified

4) Administration and nature of encoding task(s)

a) What was the encoding task(s)?
.....
.....
.....

b) Were the instructions for the encoding task adequately described?
1 Adequately described 0 Inadequately described.

c) *Were the instructions standardised and presented in a standardised manner?*
2 Yes (including instructions were administered by computer)
1 Some standardisation but full standardisation absent or unspecified or standardised presentation unspecified.
0 Unspecified 0 No

d) Was the level of threat/stress associated with materials evaluated?
1.5 Yes, participants assessed all materials directly for level of threat
1Participants assessed some materials directly and this was considered in the analysis
1 Participants did not assess directly but assessed by a comparable group
0.5 Participants did not assess directly but was assessed by another means
0 Unspecified 0 No

e) Was the order of presentation randomised?
2 Yes 1 Yes but inadequate or not fully specified
0 Unspecified 0 No

f) *Were task administrators blind to participants' conditions?*
2 Yes 1 Yes but inadequate or not fully specified

0 Unspecified *0 No*

g) What was/were the control task(s)?

.....
.....
.....

h) Was there a task to control for:
(i) General memory impairment rather than trauma-specific memory bias? (this includes tasks that present neutral stimuli) 1 Yes 0 No
(ii) Negative emotional valence? (e.g. a control task with stimuli that evoke negative emotions but that are not related to the trauma) 1 Yes 0 No
(iii) Positive emotional valence? 1 Yes 0 No
(iv) Primacy/recency effects? (e.g. a distractor task) 1 Yes or not applicable 0 No

i) Were materials matched across tasks? (e.g. were they matched for word length and frequency of usage) (please specify matching).....
1 Yes or not applicable 0 Unspecified 0 No

5) Nature, administration and scoring of the retrieval task

a) What was the retrieval task(s)?

.....
.....
.....

b) Were the instructions for the retrieval task adequately described?
1 Adequately described 0 Inadequately described.

c) *Were the instructions standardised and presented in a standardised manner?*
2 Yes (including instructions were administered by computer)
1 Some standardisation but full standardisation absent or unspecified or standardised presentation unspecified.
0 Unspecified *0 No*

d) *Were subjects' responses recorded in a standardised manner and was the appropriate use of this method verified?*
2 Yes or not applicable *1 Partially specified* *0 Unspecified* *0 No*

e) *Were methods for scoring subjects' responses described, standardised and verified?*
2 Yes or not applicable *1 Partially specified* *0 Unspecified* *0 No*

6) Analysis

a) Were the following features relating to the retrieval task(s) pertaining to memory bias adequately described for all groups?
(i) Means 1 Yes 0 No
(ii) Standard deviations 1 Yes 0 No

b) What was the statistical analysis method(s) for the retrieval task pertaining to memory bias?

.....
.....
.....

c) Is the statistical analysis generally appropriate to the design and type of outcome measure? (please specify why not appropriate)
2 Yes
1 Appears appropriate but insufficient information to guarantee.
0 Unclear e.g. insufficient information available to determine
0 Not appropriate
.....
.....
.....

Brief description of results?

Brief interpretation of findings?

General criticisms that apply to this study

Appendix 3 MRP Proposal Appendices

Primary Care Division

Gartnavel Royal Hospital
1055 Great Western Road
Glasgow G12 0XH
Tel: 0141 211 3600
www.nhsgg.org.uk

NHS
Greater Glasgow

Mr Stephen D Marks
Trainee Clinical Psychologist
Greater Glasgow Primary Care Trust/University of Glasgow
Section of Psychological Medicine,
University of Glasgow,
Gartnavel Royal Hospital,1055 Great Western Road
GLASGOW
G12 0XH

Date 31 August 2004
Your Ref
Our Ref

Direct line 0141 211 3824
Fax 0141 211 3814
E-mail anne.mcmahon@gartnavel.glacomen.scot.nhs.uk

Dear Mr Marks

Full title of study: Depth-of-processing and trauma-induced memory bias in survivors of burns injuries.
REC reference number: 04/S0701/62
Protocol number: two

Thank you for your application for ethical review, which was received on 26 August 2004. I can confirm that the application is valid and will be reviewed by the Ethics Committee at the meeting on 09 September 2004.

Documents received

The documents to be reviewed are as follows:

Document Type: Application
Version: one
Dated: 26/08/2004
Date Received: 26/08/2004

Document Type: Investigator CV

Version: SM - one
Dated: 26/08/2004
Date Received: 26/08/2004

Document Type: Investigator CV
Version: EC - one
Dated: 26/08/2004
Date Received: 26/08/2004

Document Type: Protocol
Version: two
Dated: 20/08/2004
Date Received: 26/08/2004

Document Type: Covering Letter
Version: AG
Dated: 22/04/2004
Date Received: 26/08/2004

Document Type: Covering Letter
Version: SW
Dated: 20/07/2004
Date Received: 26/08/2004

Document Type: Covering Letter
Version: IT
Dated: 28/06/2004
Date Received: 26/08/2004

Document Type: Copy of Questionnaire
Version: Trauma prose passage 1 - one
Dated: 26/08/2004
Date Received: 26/08/2004

Document Type: Copy of Questionnaire
Version: one
Dated: 26/08/2004
Date Received: 26/08/2004

Document Type: Copy of Questionnaire
Version: Neutral prose passage 1 - one
Dated: 26/08/2004
Date Received: 26/08/2004

Document Type: Copies of Advertisements
Version: Burn injured participants - one
Dated: 22/08/2004
Date Received: 26/08/2004

Document Type: Copies of Advertisements
Version: Control group - one
Dated: 22/08/2004

Date Received: 26/08/2004

Document Type: Participant Information Sheet
Version: Patient - one
Dated: 22/08/2004
Date Received: 26/08/2004

Document Type: Participant Information Sheet
Version: Control group - one
Dated: 22/08/2004
Date Received: 26/08/2004

Document Type: Participant Consent Form
Version: Control group - one
Dated: 26/08/2004
Date Received: 26/08/2004

Document Type: Participant Consent Form
Version: Burn injured - one
Dated: 26/08/2004
Date Received: 26/08/2004

Document Type: Other
Version: Letter to GRI Consultant - one
Dated: 26/08/2004
Date Received: 26/08/2004

Document Type: Other
Version: Letter to GP - one
Dated: 26/08/2004
Date Received: 26/08/2004

Document Type: Other
Version: Letter of appointment
Dated: 26/09/2002
Date Received: 26/08/2004

No changes may be made to the application before the meeting. If you envisage that changes might be required, we would advise you to withdraw the application and re-submit it.

Meeting arrangements

The meeting will be held at Boardroom on 09 September 2004 at 14:00:00. The Committee would find it helpful if you could attend the meeting to respond to any questions from members. Other key investigators are also welcome to attend. This may avoid the need to request further information after the meeting, and enable the Committee to make a decision on the application more quickly.

I will let you know the time of the review and ask you to confirm your availability as soon as the agenda has been finalised.

Notification of the Committee's decision

You will receive written notification of the outcome of the review within 10 working days of the meeting. The Committee will issue a final ethical opinion on the application within a maximum of 60 days from the date of receipt, excluding any time taken by you to respond fully to one request for further information or clarification after the meeting.

Site-specific assessments

If the main REC is also the LREC for the lead site: The Committee will carry out the site-specific assessment for this site at the same time as the ethical review.

You should now arrange for site-specific assessment to be carried out for all other sites at which Principal Investigators are to be appointed to conduct the research locally.

Part C of the application form (complete with all signatures) together with a copy of the Principal Investigator's curriculum vitae should be sent to the relevant Local Research Ethics Committee (LREC) for each site. No further documents need to be submitted. Site-specific assessment is confined to an assessment of the suitability of the local investigators, support staff, site and facilities.

The local assessor will be either the LREC itself or another assessor approved for the site by the relevant Office for Research Ethics Committees. Local assessors have 30 days in which to notify this Committee whether or not there is any objection on site-specific grounds. We would then confirm the favourable ethical opinion for each site in writing to you.

At least one site-specific assessment should be submitted within 15 days of the date of this letter. If no sites have been approved within the 60 day period for the ethical review, the application could be rejected.

Management approval

If you are the Principal Investigator for the lead site: You should seek approval from your host organisation to conduct this research.

Principal Investigators at all other sites should seek approval from their host organisation to participate in this research.

The management approval process may take place at the same time as the ethical review. Final management approval from host organisations will not be confirmed until after a favourable ethical opinion has been given by this Committee.

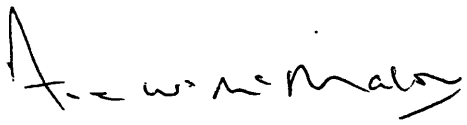
Communications with sponsor and host organisations

All further communications from the Committee relating to this application will be solely with you as Chief Investigator. It will be your responsibility to inform your sponsor and

host organisations of the progress of the review, as necessary. At the end of the review, we will inform the sponsor of the outcome.

REC reference number: 04/S0701/62 **Please quote this number on all correspondence**

Yours sincerely,



Mrs Anne W McMahon
Research Ethics Committee Coordinator

Cc Mr Brian Rae

North Glasgow University Hospitals
NHS Trust

Glasgow Royal Infirmary LREC (2)
4th floor. Walton Building
Glasgow Royal Infirmary
84 Castle Street
GLASGOW
G4 0SF
Tel: 0141 211 4020
Fax: 0141 232 0752

NHS
Greater
Glasgow

Date 31 August 2004

Enquiries to Mrs Sharon Macgregor
Email:sharon.macgregor@northglasgow.scot.nhs.uk

Chairman: Dr Malcolm Booth

Mr Stephen D Marks
Trainee Clinical Psychologist
Greater Glasgow Primary Care
Trust/University of Glasgow
Section of Psychological Medicine,
University of Glasgow,
Gartnavel Royal Hospital
1055 Great Western Road
GLASGOW
G12 0XH

Dear Mr Marks,

Full title of study: Depth-of-processing and trauma-induced memory bias in survivors of burns injuries.
REC reference number: 04/S0705/36
Protocol number: Protocol Ref N/A

Thank you for your application to conduct the above research as Principal Investigator for North Glasgow University Hospitals Division. I can confirm that the application was received on 31 August 2004.

An assessment of the suitability of the local investigator(s), support staff, site and facilities will be made by the Local Research Ethics Committee. We will notify the main Research Ethics Committee NHS Greater Glasgow Primary Care Division (Community & Mental Health) within 25 days of receiving your application whether or not there is any objection to the research being conducted locally.

It is the responsibility of the Chief Investigator for the study to let you know when the study has a favourable ethical opinion from the main Research Ethics Committee. It is your responsibility to ensure you have final management approval from the host organisation before commencing any research procedures.

Yours sincerely

R Gallacher

Mrs Rose Gallacher
Clerical Assistant

Copy to:

North Glasgow University Hospitals Division
Research & Development Office
4th Floor Walton Building
Glasgow Royal Infirmary
84 Castle Street
GLASGOW
G4 0SF
UK

Primary Care Division

Gartnavel Royal Hospital
1055 Great Western Road
Glasgow G12 0XH
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NHS
Greater Glasgow

Mr Stephen D Marks
Trainee Clinical Psychologist
Greater Glasgow Primary Care Trust/University of Glasgow
Section of Psychological Medicine,
University of Glasgow,
Gartnavel Royal Hospital,1055 Great Western Road
GLASGOW
G12 0XH

Date 14 September 2004
Your Ref
Our Ref

Direct line 0141 211 3824
Fax 0141 211 3814
E-mail anne.mcmahon@gartnavel.glacomen.scot.nhs.uk

Dear Mr Marks

Full title of study: Depth-of-processing and trauma-induced memory bias in survivors of burns injuries.
REC reference number: 04/S0701/62
Protocol number: two

The Research Ethics Committee reviewed the above application at the meeting held on 09 September 2004.

Documents reviewed

The documents reviewed at the meeting were:

Document Type: Application
Version: one
Dated: 26/08/2004
Date Received: 26/08/2004

Document Type: Investigator CV
Version: SM - one
Dated: 26/08/2004
Date Received: 26/08/2004

Document Type: Investigator CV
Version: EC - one

Dated: 26/08/2004
Date Received: 26/08/2004

Document Type: Protocol
Version: two
Dated: 20/08/2004
Date Received: 26/08/2004

Document Type: Covering Letter
Version: AG
Dated: 22/04/2004
Date Received: 26/08/2004

Document Type: Covering Letter
Version: SW
Dated: 20/07/2004
Date Received: 26/08/2004

Document Type: Covering Letter
Version: IT
Dated: 28/06/2004
Date Received: 26/08/2004

Document Type: Copy of Questionnaire
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Document Type: Copy of Questionnaire
Version: one
Dated: 26/08/2004
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Date Received: 26/08/2004

Document Type: Participant Information Sheet
Version: Patient - one
Dated: 22/08/2004
Date Received: 26/08/2004

Document Type: Participant Information Sheet
Version: Control group - one
Dated: 22/08/2004

Date Received: 26/08/2004

Document Type: Participant Consent Form
Version: Control group - one
Dated: 26/08/2004
Date Received: 26/08/2004

Document Type: Participant Consent Form
Version: Burn injured - one
Dated: 26/08/2004
Date Received: 26/08/2004

Document Type: Other
Version: Letter to GRI Consultant - one
Dated: 26/08/2004
Date Received: 26/08/2004

Document Type: Other
Version: Letter to GP - one
Dated: 26/08/2004
Date Received: 26/08/2004

Document Type: Other
Version: Letter of appointment
Dated: 26/09/2002
Date Received: 26/08/2004

Provisional opinion

Committee discussed this proposal and would be content to give a favourable ethical opinion of the research subject to receiving a complete response to the request for further information below -

a) Recruitment - there is a Data Protection issue in names and contact details of potential participants being passed on to the Chief Investigator.

b) PIS - the "thank you" phrase should be removed.

c) Consent form - consent required for audio taping

d) logos, version numbers required on both PIS/consent form

e) The use of quotes could break confidentiality as participants could be identified.

f) Interview time of 1 hour does not allow time for anything else.

g) QA51 - review of statistic procedure required and clarification of the use of two-tailed hypothesis

h) QA68 (and PIS) - adequate support should be readily available - inappropriate to give contact details for Samaritans, GP, hospital.

i) Committee feel that the phrase "depth of processing" should be clarified

Authority to consider your response and to confirm the Committee's final opinion has been delegated to a meeting of the Sub-Committee of the REC.

When submitting a response to the Committee, please send revised documentation where appropriate underlining the changes you have made and giving revised version numbers and dates. Failure to do this will delay consideration of the revisions.

The Committee will issue a final ethical opinion on the application within a maximum of 60 days from the date of initial receipt of the application, excluding the time taken by you to respond fully to the above points.

The Committee expects to receive a response from you by no later than 12 January 2005, otherwise we shall consider the application to have been withdrawn.

Membership of the Committee

The members of the Ethics Committee who were present at the meeting are listed on the attached sheet.

Communication with sponsor and host organisations

This communication is confidential but you may wish to you to forward copies to your sponsor and/or host organisation(s) for their information.

Statement of compliance

The Committee is constituted in accordance with the Governance Arrangements for Research Ethics Committees (July 2001) and complies fully with the Standard Operating Procedures for Research Ethics Committees in the UK.

REC reference number: 04/S0701/62 Please quote this number on all correspondence

Yours sincerely,

Mrs Anne W McMahon
Research Ethics Committee Coordinator

Enclosures *List of names and professions of members who were present at the meeting and those who submitted written comments*

NHS
Greater
Glasgow

RESEARCH ETHICS COMMITTEE

Meeting held on: **9 September 2004**

Division Headquarters
Gartnavel Royal Hospital
1055 Gt Western Road
Glasgow G12 0XH

Committee Members present:

Dr Paul Fleming	Consultant Clinical Psychologist (Chair)
Dr John Baird	Consultant Psychiatrist
Ms Sue Downie	Lay Member
Rev Cameron Langlands	Lay Member
Ms Anne McLean	Lay Member
Dr Robert McNeil	General Practitioner
Ms Mary Newton	Head of Profession – PAMs

Comments Received - Martin Hattie – Clinical Nurse Specialist

Mr Stephen Marks
Trainee Clinical Psychologist
Section of Psychological Medicine
University of Glasgow
Gartnavel Royal Hospital
1055 Great Western Road
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tel: 0141 211 0607
email: 0206195m@student.gla.ac.uk

Mrs Anne McMahon
Research Ethics Committee Coordinator
NHS Greater Glasgow Primary Care Division
Gartnavel Royal Hospital
1055 Great Western Road
Glasgow
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October 29th, 2004

Dear Mrs McMahon

Re: Amendments to Corec form, study protocol and supporting documents for proposed study "Depth-of-processing and trauma-induced memory bias in survivors of burns injuries". 04/S0701/62

Thank you for your letter of September 14th 2004. Please pass on my thanks to the Ethics Committee for their review on September 9th 2004 and comments relating to the above study.

The Committee requested a response and further information regarding 9 points and I have now revised relevant documentation accordingly. Please find attached a list of suggested revisions with a description of changes that have been made subsequent to your comments. I have also enclosed amended documents, including the amended Corec form and study protocol.

I would be very grateful if you could pass this documentation on to the Sub-Committee of the REC for their consideration.

Please contact me if you have any queries.

Yours sincerely

STEPHEN MARKS
TRAINEE CLINICAL PSYCHOLOGIST

Amendments to ethics application form 04/S0701/62 and supporting documents following review on September 9th 2004 by Research Ethics Committee for NHS Greater Glasgow - Primary Care Division

Full title of study: Depth-of-processing and trauma-induced memory bias in survivors of burn injuries.

REC reference number: 04/S0701/62

Below is a list of comments and suggestions produced by members of the ethics committee following the above review. For each point a description is provided of revisions that have been made in response to comments. New version numbers and dates have been assigned to all documents that have been changed. Amendments are highlighted in italics (but will be changed to normal text once approved) on all documents except the Corec form (changes to the latter are specified below).

a) **Comment** - "Recruitment - there is a data protection issue in names and contact details of potential participants being passed on to the Chief Investigator."

Response/revision – Further clarification of this issue highlighted the fact that contact details cannot be passed on to the chief investigator by third party individuals and can only be provided by the potential participants themselves. Consequently, individuals involved in recruitment will be asked to distribute an opt-in letter along with the patient information sheet. A copy of this document is attached for consideration by the ethics committee. Sections A 20 and A39 (comments section) of the Corec form have been altered to highlight this amended issue.

b) **Comment** - "PIS - the "thank you" phrase should be removed."

Response/revision - The phrase "Thank you very much for taking part in this study" has been removed as advised for both patient information leaflets.

c) **Comment** - "Consent form - consent required for audio taping."

Response/revision - A question asking participants to consent to audio recording has been added to both consent forms. Sections A 26 and A39 (comments section) of the Corec form have also been altered to highlight this amended issue.

d) **Comment** - "logos, version numbers required on both PIS/Consent form."

Response/revision - Logos and version numbers have been added to both PIS and consent forms. Logos have also been added to recruitment posters.

e) **Comment** - "The use of quotes could break confidentiality as participants could be identified."

Response/revision – A point relating to this issue has been added to each consent form. Any quotes that are used will be anonymised and will have all identifying information removed. Participants are informed of this via the consent form with:

> "I understand that some of my comments may be included in the written report of this study. I understand that if this does occur, my name will not be reported and any information that could be used to identify me will be removed. I hereby give my permission for my comments to be used in this manner."

Sections A 26 and A39 (comments section) of the Corec form have been altered to highlight this amended issue.

f) **Comment** - "Interview time of one hour does not allow time for anything else."

Response/revision - The interview time of one hour has been extended to one and half hours. This has been changed on the ethics application form and patient information sheets.

g) **Comment** - "Q A51 - review of statistical procedure required and clarification of the use of two-tailed hypothesis."

Response/revision –

The two-tailed hypothesis has been changed to a one-tailed hypothesis. The study proposal ("Aims and Hypotheses" section and the "Power Calculation" section) and Sections A7, A10 and A51 of the Corec form have been altered to highlight this amended issue.

Changes have been made to the "Data analysis" section of the study protocol and to the corresponding section of the Corec form (A53), with regards to statistical methods employed in the main analysis. Changes include:

- Specification regarding the approach that will be adopted to assess the normality of data, any transformations that might be required to allow parametric testing and specification of alternative non-parametric tests.
- Clarification regarding the use of an Anova and possible covariants.
- Removal of the sentence relating to post hoc analyses following the Anova, as this was incorrect.

Some changes have been made to the "Power calculation" section of the study protocol (sections A50, A51, C11 of the Corec form have therefore also been altered accordingly). Changes include:

- Further clarification regarding the method for the power calculation (the Corec form has not been altered with respect to this issue).
- A slight adjustment to the target effect size (0.98 becomes 1.01) after a more effective formula was employed to calculate this figure.
- Changes in target sample sizes from 24 for the control group to 20, and 21 for the trauma group to 17. These changes arose because a less conservative one-tailed hypothesis was adopted in the power calculation rather than the original two-tailed hypothesis. The "participant" section of the protocol has also been changed to include new sample sizes.

Several elements have been removed from the "data analysis" section of the study protocol, as they are more appropriately placed within other sections. However, for ease of understanding, these elements have not been changed on the Corec form. Elements include:

- The sentence pertaining to statistical tests for matching of demographic variables between groups, which has been moved to the "participants" section.
- The allusion to the use of Cohen's Kappa Coefficeint in comparing evaluators' ratings about trauma-passages and whether they reflect more trauma-related anxiety than the neutral passages. This has been moved to the "stimuli" section.
- The allusion to the use of Cohen's Kappa Coefficeint in comparing blind raters' scoring of passages. This has been moved to the "procedure" section.

h) **Comment** - "Q A68 (and PIS) - adequate support should be readily available - inappropriate to give contact details for Samaritans, GP, hospital."

Response/revision – The original ethics application suggested that "contact details for Samaritans, GP, hospital" would be provided as a support mechanism for any individual who became distressed after the task. This suggestion has been removed from section A68 of the Corec form and from both Patient information leaflets (PILs sections "What are the possible disadvantages and risks of taking part?").

Burn injured participants will continue to be offered a referral to the Clinical Psychology department of the Burns Unit if untreated clinical disorders are detected. However, burn injured participants will also be given the phone number of Dr Kim Kirkwood a Clinical Psychologist at the Burns Unit and advised to use this if they become distressed after the task. Dr Kirkwood has agreed to provide appropriate support to such individuals if this is necessary. This amended issue has been altered in section A68 and on the PIS (same section as above) for burn injured participants.

Control group participants will be advised to seek an appointment with their GP if an untreated clinical disorder is identified. Due to the slight possibility of these individuals becoming distressed after the task, they will be given the phone number of Dr Linda Campsie, Consultant Clinical Psychologist. Dr Campsie has agreed to provide

appropriate support should control group participants experience distress. This amended issue has been altered in section A68 and on the PIS (same section as above) for control group participants.

i) **Comment** - "Committee feel that the phrase "depth of processing" should be clarified."

Response/revision – Amendments have been made to pages 2 and 3 ("summary" and "introduction" sections) of the study proposal to address this issue. Amendments have also been made to Sections A9 and A69 of the Corec form regarding this issue. Amendments involve the addition of an explanatory paragraph relating to the term "depth-of-processing" in both documents and some other minor content (both documents) and formatting (Corec form only) changes.

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Greater Glasgow

Mr Stephen D Marks
Trainee Clinical Psychologist
University of Glasgow,
Section of Psychological Medicine
Gartnavel Royal Hospital,
1055 Great Western Road
GLASGOW
G12 0XH

Date 30 November 2004
Your Ref
Our Ref

Direct line 0141 211 3824
Fax 0141 211 3814
E-mail anne.mcmahon@gartnavel.glacomen.scot.nhs.uk

Dear Mr Marks

Full title of study: *Depth-of-processing and trauma-induced memory bias in survivors of burns injuries.*
REC reference number: *04/S0701/62*
Protocol number:

Thank you for your letter of 29 October 2004, responding to the Committee's request for further information on the above research and submitting revised documentation.

The further information was considered at the meeting of the Sub-Committee of the REC held on 25 November 2004. A list of the members who were present at the meeting is attached.

Confirmation of ethical opinion

On behalf of the Committee, I am pleased to confirm a favourable ethical opinion for the above research on the basis described in the application form, protocol and supporting documentation as revised

The favourable opinion applies to the research sites listed on the attached form. Confirmation of approval for other sites listed in the application will be issued as soon as local assessors have confirmed that they have no objection.

Conditions of approval

The favourable opinion is given provided that you comply with the conditions set out in the attached document. You are advised to study the conditions carefully.

Approved documents

The final list of documents reviewed and approved by the Committee is as follows:

Document Type:	Version:	Dated:	Date Received:
Application	one	26/08/2004	26/08/2004
Application	two		08/11/2004
Investigator CV	SM - one	26/08/2004	26/08/2004
Investigator CV	EC - one	26/08/2004	26/08/2004
Protocol	two	22/10/2004	08/11/2004
Protocol	two	20/08/2004	26/08/2004
Covering Letter	AG	22/04/2004	26/08/2004
Covering Letter	SW	20/07/2004	26/08/2004
Covering Letter	IT	28/06/2004	26/08/2004
Copy of Questionnaire	one	26/08/2004	26/08/2004
Copy of Questionnaire	Neutral prose passage 1 - one	26/08/2004	26/08/2004
Copy of Questionnaire	Trauma prose passage 1 - one	26/08/2004	26/08/2004
Copies of Advertisements	Burn injured participants -two	20/09/2004	08/11/2004
Copies of Advertisements	control group - two	20/09/2004	08/11/2004
Copies of Advertisements	Burn injured participants - one	22/08/2004	26/08/2004
Copies of Advertisements	Control group - one	22/08/2004	26/08/2004
Participant Information Sheet	Patient - one	22/08/2004	26/08/2004
Participant Information Sheet	Control group - one	22/08/2004	26/08/2004
Participant Information Sheet	two	20/09/2004	08/11/2004
Participant Information Sheet	control group - two	20/09/2004	08/11/2004
Participant Consent Form	Control group - one	26/08/2004	26/08/2004
Participant Consent Form	Burn injured - one	26/08/2004	26/08/2004
Participant Consent Form	Control group - two	20/09/2004	08/11/2004
Participant Consent Form	Burn injured - two	20/09/2004	08/11/2004
Response to Request for Further Information	one	29/10/2004	08/11/2004
Other	Letter of appointment	26/09/2002	26/08/2004
Other	opt in control group - one	05/10/2004	08/11/2004
Other	opt in - burn injured	05/10/2004	08/11/2004

	- one		
Other	Letter to GRI Consultant - one	26/08/2004	26/08/2004
Other	Letter to GP - one	26/08/2004	26/08/2004

Management approval

The study should not commence at any NHS site until the local Principal Investigator has obtained final management approval from the R&D Department for the relevant NHS care organisation.

Membership of the Committee

The members of the Ethics Committee who were present at the meeting are listed on the attached sheet.

Notification of other bodies

The Committee Administrator will notify the research sponsor that the study has a favourable ethical opinion.

Statement of compliance

The Committee is constituted in accordance with the Governance Arrangements for Research Ethics Committees (July 2001) and complies fully with the Standard Operating Procedures for Research Ethics Committees in the UK.

04/S0701/62 **Please quote this number on all correspondence**

With the Committee's best wishes for the success of this project,

Yours sincerely

Anne W McMahon
Research Ethics Co-ordinator on behalf of Dr Paul Fleming, Chairman

NHS
Greater
Glasgow

RESEARCH ETHICS COMMITTEE

Meeting held on: **25 November 2004**

Division Headquarters
Gartnavel Royal Hospital
1055 Gt Western Road
Glasgow G12 0XH

Committee Members present:

Mr Philip Dolan (Vice Chair - Acting Chair)	Lay Member
Dr Robert McNeil	General Practitioner

Comments Received

Mr Stephen Marks
Trainee Clinical Psychologist
Section of Psychological Medicine
University of Glasgow
Gartnavel Royal Hospital
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tel: 0141 211 0607
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Mrs Anne McMahon
Research Ethics Committee Coordinator
NHS Greater Glasgow Primary Care Division
Gartnavel Royal Hospital
1055 Great Western Road
Glasgow
G12 0XH

February 21st 2005

Dear Mrs McMahon

Re: Request for approval for amendments to study protocol "Depth-of-processing and trauma-induced memory bias in survivors of burns injuries, v.2" Corec 04/S0701/62 and supporting documents.

I am writing to request ethical approval from the Research Ethics sub-committee for further amendments to the above study protocol. Please find enclosed a copy of the amended protocol and relevant supporting documents with changes highlighted in italics. Amendments are described in the attached Corec "Notice of Substantial Amendment" form.

Please thank the Research Ethics sub-committee, on my behalf, for considering these proposals. Please contact me if you have any queries.

Yours sincerely

STEPHEN MARKS
TRAINEE CLINICAL PSYCHOLOGIST
Enc

NHS

Central Office for Research Ethics Committees (COREC)

NOTICE OF SUBSTANTIAL AMENDMENT

For use in the case of all research other than clinical trials of investigational medicinal products (CTIMPs). For substantial amendments to CTIMPs, please use the EU-approved notice of amendment form (Annex 2 to ENTR/CT1) at http://eudract.emea.eu.int/document.html#guidance.

To be completed in typescript by the Chief Investigator and submitted to the Research Ethics Committee that gave a favourable opinion of the research ("the main REC"). In the case of multi-site studies, there is no need to send copies to other RECs unless specifically required by the main REC.

Further guidance is available in section 5 of our Standard Operating Procedures available at www.corec.org.uk/applicants/help/docs/SOPs.doc.

Details of Chief Investigator:

Name:	Stephen Marks
Address:	Section of Psychological Medicine University of Glasgow Academic Centre, Gartnavel Royal Hospital 1055 Great Western Road Glasgow G12 0XH
Telephone:	0141 211 0607
E-mail:	0206195m@student.gla.ac.uk
Fax:	0141 357 4899

Full title of study:	Depth-of-processing and trauma-induced memory bias in survivors of burn injuries.
Name of main REC:	NHS Greater Glasgow Primary Care Division (Community & Mental Health)
REC reference number:	04/S0701/62
Date study commenced:	Recruitment commenced January 15th 2005. No testing commenced due to recruitment difficulties. First appointment 9/3/05.
Protocol reference *(if applicable)*, current version and date:	Current version v.2 October 22nd 2004.
Amendment number and date:	New version v.3 February 22nd 2005. 2nd amendment to original protocol.

Type of amendment (indicate all that apply in bold)

(a) Amendment to information previously given on the REC application form

Yes *No*

If yes, please refer to relevant sections of the REC application in the "summary of changes" below.

(b) Amendment to the protocol

Yes *No*

If yes, please submit either the revised protocol with a new version number and date, highlighting changes in bold, or a document listing the changes and giving both the previous and revised text

(c) Amendment to the information sheet(s) and consent form(s) for participants, or to any other supporting documentation for the study

Yes *No*

If yes, please submit all revised documents with new version numbers and dates, highlighting new text in bold

Summary of changes

Briefly summarise the main changes proposed in this amendment. Explain the purpose of the changes and their significance for the study.
Supporting scientific information should be given (or enclosed separately) where the amendment significantly alters the research design or methodology, or could otherwise affect the scientific value of the study.

New end date required due to recruitment difficulties 31/07/05. Duration of study increases to 10 months. Corec section A3.

A large proportion of potential participants with burn injuries have alcohol misuse problems. These individuals were excluded in the original proposal because of the effects of alcohol on memory. However, this limits the generalisability of the study and hampers recruitment. I would therefore like to adjust the exclusion criteria to allow individuals with alcohol misuse problems to participate. (A23) This will still allow the study to consider the effect of trauma-induced memory bias as individual's memory for neutral and trauma passages will be equally affected by alcohol consumption (A10, A9/A69, C6). To assess the impact of this variable I will ask all participants to compete a brief measure of alcohol disorders, the Alcohol Use Disorder Identification Test (AUDIT). (A13, C8) (A49) (A53) This was developed by the World Health Organization to identify problem drinkers in primary care settings (Saunders et al. 1993). In a six-nation validation trial, it achieved high sensitivity and specificity in identifying heavy drinkers when a cut-off value of eight was used (Saunders et al. 1993). (A10/A69, C6/C18) Individuals may be embarrassed when completing the AUDIT but will have been pre-warned about this questionnaire in the patient information sheet and can chose not to participate. (A14)

I would like to extend the inclusion criteria to include individuals who experienced their burn up to 18 months ago as well as those burnt 12 months ago. (A22)This would allow more subjects to be recruited. The change may reduce the likelihood of individuals having Post-traumatic Stress Disorder (PTSD). However, the current study is mainly concerned with identifying memory bias, a type of cognitive bias, and cognitive biases have been found in individuals between 5 and 19 years after their burn injury (Willebrand et al 2002). (A22)

I would like to alter the exclusion criteria relating to the severity of burn injuries and include

individuals with any burn greater than 1% Total Body Surface Area (TBSA). (A22) In the original proposal only individuals with "moderate" burns based on The American Burn Association definition (Moylan 1979) were to be included. However, the unit where recruitment is taking place employs a different classification system involving mild (<15% TBSA) and severe injuries (>15% TBSA). In addition, a study by Tedstone and Tarrier (1997) reported case levels of post-traumatic symptoms in a significant minority (around 20%) of individuals 3 months post-burn even when burns were 1% TBSA or less. Including individuals with all levels of severity of injury would aid recruitment although most participants would continue to be at the milder end, as serious injuries are less common. Participants would continue to be excluded if hospital staff considered them medically unfit to participate. (A22)

I would like to ask participants to complete an additional task involving individuals rating the level of stress evoked by passages and how much each passage reminded them of their own trauma. (A10/A69, A13, C6/C18, C8) Stress and reminiscence ratings will allow me to assess whether any detected memory bias (or absence of bias) is associated with the level of anxiety evoked and/or the associations that the individual formed with their own trauma. (A10/69, C6/C18) This additional task will increase exposure to the traumatic passages but this may reduce any post-task distress as the participants will have an opportunity to habituate to the stimuli. (A17) (A68)

My original proposal predicted a memory bias towards trauma-related material in burn-injured individuals with PTSD. This was based on previous research that had only involved relatively superficial processing tasks i.e. encoding of single words. However, the study that my investigation is based on (Wenzel & Holt 2002) employed an elaborate processing task and found a bias against threat in individuals with social phobia. An equally valid alternative prediction was therefore that individuals with PTSD would show a memory bias against threat if they performed a similar trauma-specific task. Moreover, the Wenzel & Holt study was the most appropriate to use to undertake a power calculation because of the similarity in study procedures. Given the last 2 points, I would like to alter the direction of my hypotheses and predict a memory bias against threat in the burn-injured group (see below for hypotheses). (A10, C6)

In addition, a review by Buckley et al (2000) indicates that "PTSD sufferers demonstrate impaired performance on standard memory tests involving neutral information compared to those without PTSD". I would therefore like to adjust my main hypotheses to take account of the prediction that the burn-injured participants with PTSD symptoms are likely to have impaired recall for non-trauma related material. (A10, C6)The new hypotheses are:

a) Non-anxious control participants will recall a greater percentage of novel neutral prose passages compared to burn-injured participants. (A8, A 10, C6)
b) Non-anxious control participants will recall an even greater percentage of novel trauma-related prose passages compared to burn-injured participants. (A7, A 10, C6)
c) Burn-injured participants will recall a greater percentage of novel neutral prose passages compared to novel trauma-related prose passages. (A8, A 10, C6)

Finally, to increase recruitment of control participants I would like to include my own personal and occupational contacts in the list of potential control group candidates. All control individuals will be recruited by posters and I would not approach them until they indicated that they were willing for me to do so. (A20) Dr Linda Campsie, Consultant Clinical Psychologist, will act as therapeutic contact for all members of the control group in the extremely unlikely event that they become distressed by the research task. (A68)

Any other relevant information

Applicants may indicate any specific ethical issues relating to the amendment, on which the opinion of the REC is sought.

List of enclosed documents

Protocol - Depth-of-processing and trauma-induced memory bias in survivors of burn injuries. V. 3, February 22nd 2005.
Alcohol Use Disorders Identification Test – AUDIT (WHO).
Passage rating task – Burn injured participants (v.1) February 22nd 2005.
Patient information leaflet – Burn injured participants (v.3) February 22nd 2005.
Patient information leaflet – Control participants (v.3) February 27th 2005.

Declaration

- I confirm that the information in this form is accurate to the best of my knowledge and I take full responsibility for it.
- I consider that it would be reasonable for the proposed amendment to be implemented.

Signature of Chief Investigator: .....

Print name: STEPHEN MARKS

Date of submission: 25/02/05

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Mr Stephen D Marks
Trainee Clinical Psychologist
University of Glasgow,
Section of Psychological Medicine
Gartnavel Royal Hospital,
1055 Great Western Road
GLASGOW
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Date 15 March 2005
Your Ref
Our Ref

Direct line 0141 211 3824
Fax 0141 211 3814
E-mail anne.mcmahon@gartnavel.glacomen.scot.nhs.uk

Dear Mr Marks

Full title of study: *Depth-of-processing and trauma-induced memory bias in survivors of burns injuries.*
REC reference number: *04/S0701/62*
Protocol number:

Thank you for your letter of 21 February 2005, requesting an amendment to the above named study.

The amendment was discussed at the Committee meeting on 10 March 2005. However, the Committee were of the view that it would be beneficial for you to come to the next meeting to clarify the following points.

a) Clarity required around the actual process – how far into the study before new process would be introduced?
b) Clarification required around the recruitment process
c) Clarification required around the exclusion criteria surrounding alcohol –this seemed very clear in the original proposal
d) Clarity required around the "Plan of investigation".

The next meeting will take place on Thursday, 14 April 2005 at Sandyford Initiative, 4th Floor Claremont House, 20 North Claremont Street, Glasgow.

Please let me know if you do intend coming along.

o4/S0701/62	**Please quote this number on all correspondence**

Yours sincerely

Anne W McMahon
Research Ethics Co-ordinator

Primary Care Division

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Mr Stephen D Marks
Trainee Clinical Psychologist
University of Glasgow,
Section of Psychological Medicine
Gartnavel Royal Hospital,
1055 Great Western Road
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G12 0XH

Date 15 March 2005
Your Ref
Our Ref

Direct line 0141 211 3824
Fax 0141 211 3814
E-mail anne.mcmahon@gartnavel.glacomen.scot.nhs.uk

Dear Mr Marks

Full title of study: *Depth-of-processing and trauma-induced memory bias in survivors of burns injuries.*
REC reference number: *04/S0701/62*
Protocol number:

Thank you again for your letter of 21 February 2005, requesting an amendment to the above named study and also for coming along to the Committee meeting on 14 April 2005.

As you know the amendment was further discussed at the Committee meeting on 14 April 2005 and I am pleased to let you know that a favourable ethical opinion has been granted for this amendment..

)4/S0701/62	**Please quote this number on all correspondence**

Yours sincerely

Anne W McMahon
Research Ethics Co-ordinator

Appendix 4 Tables, figures and appendices Major research paper

MRP means tables

Table 4.1: Demographic variables for the burn-injured and control groups.

	Burn injured group (n = 13) m (sd)	**Control group (n = 15)** m (sd)
Age (years)	45.07 (14.26) range = 20.05 to 77.87	45.44 (14.81) range = 23.4 to 66.2
Years of education	11.77 (3.68) range = 8 to 22	11.73 (2.87) range = 9 to 19

Table 4.2: Psychological variables for the burn-injured and control groups.

Measure	**Burn-injured group (n = 13)** m (sd)	**Control group (n = 15)** m (sd)
PDS total	13.46 (15.1)	1.4 (3.07)
IES-R - Total	20.85 (20.12)	3.27 (7.37)
HADs - anxiety	7.08 (5.81)	5.2 (3.19)
HADs - depression	5 (4.38)	2 (2.3)
Audit	7.92 (7.86)*	4.87 (3.25)

* one burn injured individual did not complete the Audit as this assessment was introduced after he was tested.

Table 4.3: Stress ratings by group, passage and passage type.

	Group		
	Burn injured (n = 12) m (sd)	**Control (n = 15)** m (sd)	**Both groups (n = 27)** m (sd)
Neutral passages	0.29 (0.62)	0.13 (0.4)	0.2 (0.51)
Trauma passages	3.58 (2.34)	1.73 (1.16)	2.56 (1.98)
Neutral 1	0.17 (0.58)	0.07 (0.26)	0.11 (0.42)
Neutral 2	0.42 (0.79)	0.2 (0.78)	0.3 (0.78)
Trauma 1	3.5 (2.24)	1.8 (1.57)	2.56 (2.04)
Trauma 2	3.67 (2.77)	1.67 (1.11)	2.56 (2.23)

Table 4.4: Salience ratings in the burn-injured group by passage and passage type (n = 12)

	Passage type					
	Neutral 1 m (sd)	**Neutral 2** m (sd)	**Trauma 1** m (sd)	**Trauma 2** m (sd)	**Neutral Passages** m (sd)	**Trauma Passages** m (sd)
Mean salience rating	0 (0)	0.25 (0.62)	3.5 (3.5)	4.17 (3.07)	0.13 (0.31)	3.83 (2.73)

Table 4.5: Percentage recall by group, overall recall, passage and passage type.

	Group	
	Burn injured (n = 13) m (sd)	**Control (n = 15)** m (sd)
Neutral passages recall	44.61 (11.62)	52.4 (12.45)
Trauma passages recall	49.23 (12.18)	57.33 (8.64)
Overall recall	46.92 (11.32)	54.87 (9.9)
Neutral 1	41.54 (13.91)	53.07 (13.22)
Neutral 2	47.69 (12.05)	51.73 (14.06)
Trauma 1	49.54 (15.54)	58.67 (10.44)
Trauma 2	48.92 (14.62)	56 (9.68)

Table 4.6: PTSD measure mean scores as a function of subgroup.

	Subgroup		
	Control IES-R low-symptomatic (IES-R < 15) (n = 14) m (sd)	**Burn-injured IES-R low-symptomatic (IES-R < 15) (n = 6)** m (sd)	**Burn-injured IES-R high-symptomatic (IES-R 15+) (n = 7)** m (sd)
IES-R Total score	1.71 (4.43)	5.33 (4.46)	34.13 (18.6)
PDS Total score	0.86 (2.32)	3.67 (4.89)	21.86 (16.06)

Table 4.7: Percentage recall for trauma and neutral passages, and mean difference scores between trauma recall and neutral recall as a function of Subgroup.

	Subgroup		
	Control IES-R low-symptomatic (IES-R < 15) (n = 14) m (sd)	**Burn-injured IES-R low-symptomatic (IES-R < 15) (n = 6)** m (sd)	**Burn-injured IES-R high-symptomatic (IES-R 15+) (n = 7)** m (sd)
Percentage recall trauma passages	58.29 (8.11)	48.67 (10.56)	49.71 (14.26)
Percentage recall neutral passages	53 (12.69)	48 (8.29)	41.71 (13.83)
Mean difference score between trauma and neutral recall	5.29 (8.4)	0.67 (8.16)	8 (4.9)
Percentage recall overall	59.64 (9.79)	48.33 (8.57)	45.71 (13.83)

MRP medians tables
IQR = inter-quartile range
Med = median

Table 4.2a: Psychological variables for the burn-injured and control groups.

Measure	Burn-injured group (n = 13) med (IQR)	Control group (n = 15) med (IQR)
PDS total	7 (25)	0 (0)
IES-R - Total	15 (33.5)	0 (0)
HADs - anxiety	5 (9.5)	6 (5)
HADs - depression	4 (9)	1 (1)
Audit	5.5 (10.5)*	5 (3)

* one burn injured individual did not complete the Audit as this assessment was introduced after he was tested.

Table 4.3a: Stress ratings by group and passage type.

	Group	
	Burn injured (n = 12) med (IQR)	**Control (n = 15)** med (IQR)
Neutral passages	0 (0.375)	0 (0)
Trauma passages	3.5 (4.5)	1.5 (1.5)

Table 4.3b: Median stress rating difference scores by group.

	Group	
	Burn-injured group med (IQR)	**Control group** med (IQR)
Median stress rating difference score between trauma and neutral passages	3.5 (3.625)	1.5 (1.5)

Table 4.4a: Salience ratings in the burn-injured group by passage type (n = 12)

	Passage type	
	Neutral Passages med (IQR)	**Trauma Passages** med (IQR)
Median salience rating	0 (0)	3.5 (4.5)

Table 4.5a: Percentage recall by group, overall recall, passage and passage type.

	Group	
	Burn injured (n = 13) med (IQR)	**Control (n = 15)** med (IQR)
Neutral passages recall	48 (17)	50 (16)
Trauma passages recall	48 (20)	60 (12)
Overall recall	47 (17.5)	55 (12)
Neutral 1	44 (22)	56 (16)
Neutral 2	48 (22)	48 (16)
Trauma 1	48 (24)	60 (20)
Trauma 2	48 (24)	56 (12)

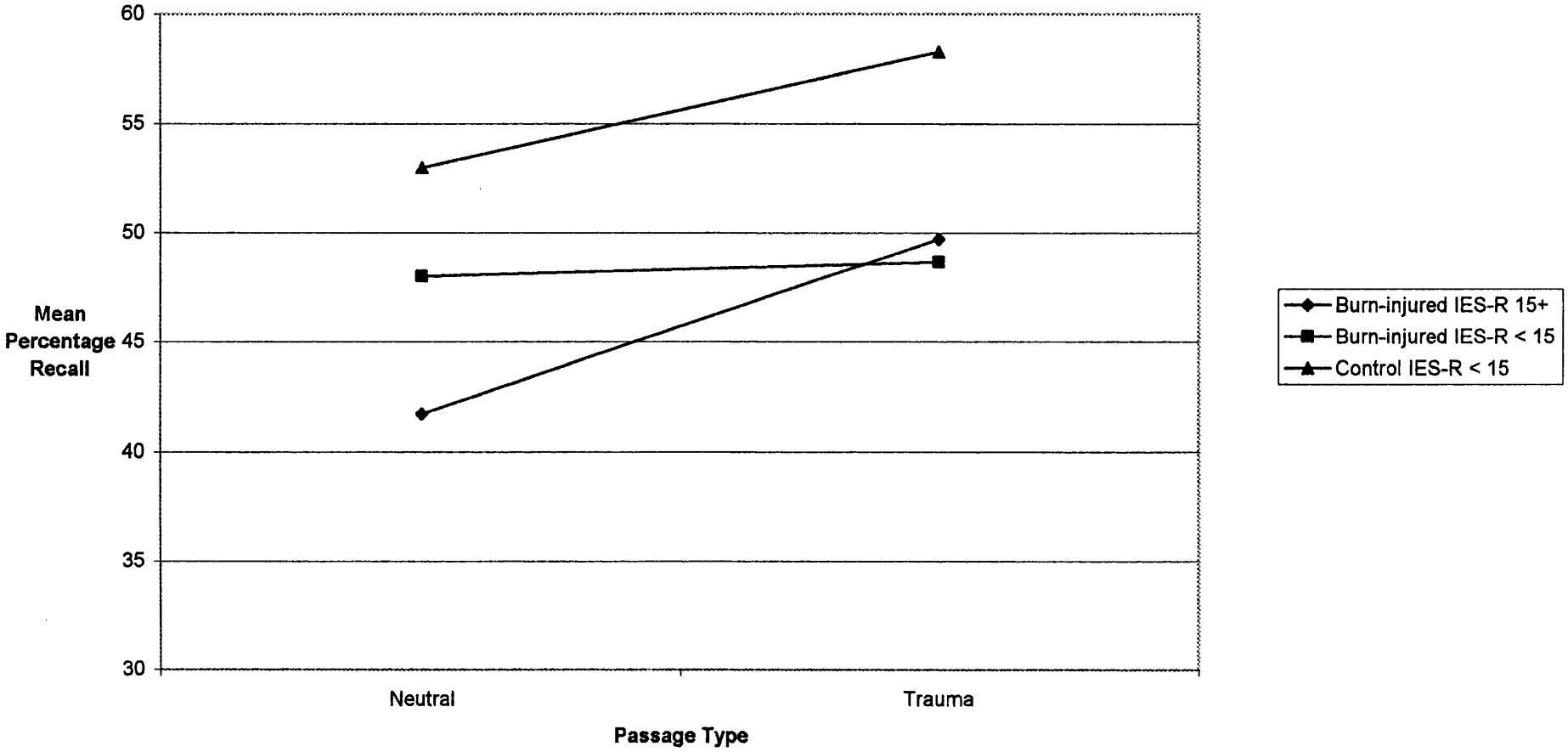
Table 4.6a: PTSD measure median scores as a function of subgroup.

	Subgroup		
	Control IES-R low-symptomatic (IES-R < 15) (n = 14) med (IQR)	**Burn-injured IES-R low-symptomatic (IES-R < 15) (n = 6)** med (IQR)	**Burn-injured IES-R high-symptomatic (IES-R 15+) (n = 7)** med (IQR)
IES-R Total score	0 (0)	5 (7.5)	25 (38)
PDS Total score	0 (0)	1.5 (6.25)	22 (27)

Table 4.7a: Percentage recall for trauma and neutral passages, and median difference scores between trauma recall and neutral recall as a function of Subgroup.

	Subgroup		
	Control IES-R low-symptomatic (IES-R < 15) (n = 14) med (IQR)	**Burn-injured IES-R low-symptomatic (IES-R < 15) (n = 6)** med (IQR)	**Burn-injured IES-R high-symptomatic (IES-R 15+) (n = 7)** med (IQR)
Median percentage recall of trauma passages	61 (9)	48 (14)	48 (26)
Median percentage recall of neutral passages	53 (16)	49 (13.5)	36 (24)
Median difference score between trauma and neutral recall	6 (14)	0 (12)	8 (10)

Figure 4.1: Means for percentage recall as a function of subgroup (Burn-injured IES-R high-symptomatic, Burn-injured IES-R low-symptomatic, Control IES-R low-symptomatic) and passage type



Appendix 4a Notes for Contributors - "British Journal of Clinical Psychology"

The British Journal of Clinical Psychology publishes original contributions to scientific knowledge in clinical psychology. This includes descriptive comparisons, as well as studies of the assessment, aetiology and treatment of people with a wide range of psychological problems in all age groups and settings. The level of analysis of studies ranges from biological influences on individual behaviour through to studies of psychological interventions and treatments on individuals, dyads, families and groups, to investigations of the relationships between explicitly social and psychological levels of analysis.

The following types of paper are invited:

Papers reporting original empirical investigations;

- Theoretical papers, provided that these are sufficiently related to the empirical data;
- Review articles which need not be exhaustive but which should give an interpretation of the state of the research in a given field and, where appropriate, identify its clinical implications;
- Brief reports and comments.

1. Circulation

The circulation of the Journal is worldwide. Papers are invited and encouraged from authors throughout the world.

2. Length

Papers should normally be no more than 5,000 words, although the Editor retains discretion to publish papers beyond this length in cases where the clear and concise expression of the scientific content requires greater length.

3. Reviewing

The journal operates a policy of anonymous peer review. Papers will normally be scrutinised and commented on by at least two independent expert referees (in addition to the Editor) although the Editor may process a paper at his or her discretion. The referees will not be aware of the identity of the author. All information about authorship including personal acknowledgements and institutional affiliations should be confined to the title page (and the text should be free of such clues as identifiable self-citations e.g. 'In our earlier work...').

4. Online submission process

1) All manuscripts must be submitted online at http://bjcp.edmgr.com .

> First-time users: click the REGISTER button from the menu and enter in your details as instructed. On successful registration, an email will be sent informing you of your user name and password. Please keep this email for future reference and proceed to LOGIN. (You do not need to re-register if your status changes e.g. author, reviewer or editor).
> Registered users: click the LOGIN button from the menu and enter your user name and password for immediate access. Click 'Author Login'.

2) Follow the step-by-step instructions to submit your manuscript.

3) The submission must include the following as separate files:

- Title page consisting of manuscript title, authors' full names and affiliations, name and address for corresponding author - Editorial Manager Title Page for Manuscript Submission
- Abstract
- Full manuscript omitting authors' names and affiliations. Figures and tables can be attached separately if necessary.

4) If you require further help in submitting your manuscript, please consult the Tutorial for Authors - Editorial Manager - Tutorial for Authors
Authors can log on at any time to check the status of the manuscript.

5. Manuscript requirements

- Contributions must be typed in double spacing with wide margins. All sheets must be numbered.
- Tables should be typed in double spacing, each on a separate page with a self-explanatory title. Tables should be comprehensible without reference to the text. They should be placed at the end of the manuscript with their approximate locations indicated in the text.
- Figures can be included at the end of the document or attached as separate files, carefully labelled in initial capital/lower case lettering with symbols in a form consistent with text use. Unnecessary background patterns, lines and shading should be avoided. Captions should be listed on a separate page. The resolution of digital images must be at least 300 dpi.
- For articles containing original scientific research, a structured abstract of up to 250 words should be included with the headings: Objectives, Design, Methods, results, Conclusions. Review articles should use these headings: Purpose, Methods, Results, Conclusions: British Journal of Clinical Psychology - Structured Abstracts Information
- For reference citations, please use APA style. Particular care should be taken to ensure that references are accurate and complete. Give all journal titles in full.
- SI units must be used for all measurements, rounded off to practical values if appropriate, with the Imperial equivalent in parentheses.
- In normal circumstances, effect size should be incorporated.
- Authors are requested to avoid the use of sexist language.
- Authors are responsible for acquiring written permission to publish lengthy quotations, illustrations etc for which they do not own copyright.

For Guidelines on editorial style, please consult the APA Publication Manual published by the American Psychological Association, Washington DC, USA (http://www.apastyle.org).

6. Brief reports and comments

These allow publication of research studies and theoretical, critical or review comments with an essential contribution to make. They should be limited to 2000 words, including references. The abstract should not exceed 120 words and should be structured under these headings: Objective, Method, Results, Conclusions. There

should be no more than one table or figure, which should only be included if it conveys information more efficiently than the text. Title, author and name and address are not included in the word limit.

7. Publication ethics
Code of Conduct - Code of Conduct, Ethical Principles and Guidelines
Principles of Publishing - Principle of Publishing

8. Supplementary data
Supplementary data too extensive for publication may be deposited with the British Library Document Supply Centre. Such material includes numerical data, computer programs, fuller details of case studies and experimental techniques. The material should be submitted to the Editor together with the article, for simultaneous refereeing.

9. Post acceptance
PDF page proofs are sent to authors via email for correction of print but not for rewriting or the introduction of new material. Authors will be provided with a PDF file of their article prior to publication for easy and cost-effective dissemination to colleagues.

10. Copyright
To protect authors and journals against unauthorised reproduction of articles, The British Psychological Society requires copyright to be assigned to itself as publisher, on the express condition that authors may use their own material at any time without permission. On acceptance of a paper submitted to a journal, authors will be requested to sign an appropriate assignment of copyright form.

11. Checklist of requirements
- Abstract (100-200 words)
- Title page (include title, authors' names, affiliations, full contact details)
- Full article text (double-spaced with numbered pages and anonymised)
- References (APA style). Authors are responsible for bibliographic accuracy and must check every reference in the manuscript and proofread again in the page proofs.
- Tables, figures, captions placed at the end of the article or attached as separate files.

Appendix 4b Prevalence of PTSD in burns survivors

Lawrence et al (1996) found that 78%, 43% and 65% of individuals met DSM-III criteria for intrusive, avoidant and hyperarousal symptoms respectively during the first year after hospital admission. Tedstone and Tarrier (1997) identified "case" levels of intrusion and avoidance in 40% of individuals three months post-burn using the Impact of Event Scale (Horowitz et al 1979). Moreover, Patterson et al (1990) and Byrant (1996) report that 30-31% meet diagnostic criteria while inpatients and Byrant (1996) found that 29% were still experiencing sub-clinical symptoms 12 months post-burn.

Appendix 4c Burn-injured group burn characteristics

In the burn-injured group, severity of burns ranged from 2% Total Burn Surface Area to 23% with a mean of 10.08% (s.d. 5.77). Two participants (15.4%) had superficial burns, five partial thickness burns (38.8%) and six (46.2%) had full thickness burns. Burns were to the legs (4 individuals, 30.8%), arms and legs (2, 15.4%), torso and arms (4, 30.8%), arms only (1, 7.7%) or face and other body parts (2, 15.4%). Burns were due to flames (4 individuals, 30.8%), hot liquid (3, 23.1%), flames and hot liquid (2, 15.4%), chemicals (1, 7.7%), electricity (1, 7.7%), friction (1, 7.7%) and contact with a hot surface (1, 7.7%). The time since burn injury at testing ranged from 31 days to 306 days with a mean of 99.54 days (s.d. 101.88). Nine individuals (69.2%) had suffered burns 1 to 3 months previously, two (15.4%) 5 to 6 months previously and two (15.4%) 10 months before they were tested. Two of the thirteen burn injured participants were inpatients when they completed the research task whereas the other eleven were outpatients.

Burn-injured group recruitment

Recruitment was from the inpatient ward (8, 62%), outpatient dressings clinic (3, 23%), Clinical Psychology department (1, 7.5%) and Burns Liaison service (1, 7.5%)

Appendix 4d Composition of control group

Type of contact	Number of individuals
Personal acquaintances	3
NHS staff not previously known to the researcher prior to a 6-month placement undertaken during the course of the study	4
3rd party individuals known only to personal acquaintances and not previously known to the researcher	8

Appendix 4e Prose passages employed in Major Research Study

Neutral Prose Passage 1

At 6.00 on Monday evening, Joe Grant of Liverpool was watching television as he dressed to go out. A weather report interrupted the programme to warn that thunderstorms would move into the area within the next 2 to 3 hours and remain until morning. The announcer said the storm could bring hail and up to 4 inches of rain and cause the temperature to drop by 15 degrees. Joe decided to stay home. He took off his coat and sat down to watch old films.

Neutral Prose Passage 2

At 08.00 on Tuesday morning Dan Freeman of Portsmouth was travelling to work on the bus. There were road works on the route and the traffic had taken 10 minutes to cover the last 200 metres. The windows had fogged up, there was nowhere to sit and the brakes were making an unpleasant screeching noise. Dan chose to walk for the rest of the journey. He stepped onto the pavement, put his hands in his pockets and hummed to himself as he strode ahead.

Trauma Prose Passage 1

At 2.00 on Sunday afternoon, Simon Jones of Bristol was watching football on television with friends. He ran into the kitchen where some chips were deep-frying but tripped, knocking over the pan. He screamed in agony as the boiling oil poured over him and his skin began to melt. Simon stared at his raw, reddened, blistering arm and tried desperately to peel off his t-shirt but it stuck to him, pulling at his skin. His friend dowsed him with water and telephoned for an ambulance.

Trauma Prose Passage 2

At 10.00 on Friday evening, Jane Tomkinson of Newcastle was chatting enthusiastically at a party. She was standing next to lit candles and was unaware that her clothes were igniting. Her synthetic dress burst into flames, she was on fire; her legs and back were burning, she smelt and heard her hair singeing. Jane was terrified, screamed in panic and ran frantically trying to get away from the fire but she could not escape. Her partner wrapped her in a rug and called for assistance.

Appendix 4f Psychometric properties of measures for Major Research Project

The Impact of Events Scale (revised) (IES-R) (Weiss and Marmar 1997)
In a study investigating the psychometric properties of the IES-R with male Vietnam veterans, Creamer et al (2003) found high internal consistency (Cronbach's alpha = 0.96), and strong construct validity (correlation = 0.84) in comparison to the PTSD Checklist (Weathers et al 1993), which has good psychometric properties (Creamer et al 2003). The IES-R has also demonstrated high test-retest reliability but does not fully correspond to DSM-IV diagnostic criteria for PTSD. (Resick & Calhoun 2001)

The PTSD Diagnostic Scale (PDS) (Foa 1995).
The PDS has satisfactory test-retest reliability, internal consistency, and convergent and concurrent validity (Foa 1995).

The Hospital and Anxiety and Depression scale (HADs) (Zigmond & Snaith 1983)
It has been demonstrated that the HADs can effectively distinguish between the constructs of anxiety and depression (Bramley et al 1988).

The Alcohol Use Disorders Identification Test (AUDIT) (WHO)
The AUDIT demonstrated high sensitivity and specificity in identifying heavy drinkers when a cut-off value of eight points was used in a six-nation study (Saunders et al. 1993).

Appendix 4g Questionnaire assessing demographic characteristics (v.1, September 17th 2004)

ID..... Date.....

1) What is your date of birth?

2) Are you Male ☐ or Female? ☐

3) Did you go to:

Secondary school? Yes ☐ No ☐

College? Yes ☐ No ☐

University? Yes ☐ No ☐

4) What age were you when you completed your education (e.g. school, college, university)?

Or please write down your age if you are still attending an educational establishment.

Appendix 4h Exclusion criteria form for potential members of the burn injured group (v2. February 27th 2005)

Please compare each potential candidate against criteria listed below. If the individual meets any one of the exclusion criteria (or may meet any of the criteria) they cannot be included in the study. Please return the completed form to Sister ..... if the patient agrees to participate. Otherwise please destroy the form.

Patient's name..... Patient's date of birth.....
(please exclude if under 18)
Name of person completing form.....

1) On which date did the patient receive the burn?.....
(exclude, if more than 18 months ago and discontinue form)

2) Was the burn? (please circle one):
Minor – *burns of between 1% and 15% total body surface area*
Major – *burns of over 15%*
(if less than 1% TBSA, exclude and discontinue)
Please describe the burn e.g. *3rd degree burns of hands (2% TBSA) due to flame injury*
.....
.....
.....

3) Is this person considered medically fit to undertake the research task? (i.e. fit to complete questionnaires, listen to short stories and to write items they recall)
YES ☐ **NO** ☐ **UNSURE** ☐
(if no exclude, if unsure please refer this question to the patient's hospital consultant)

4) Was a friend or relative killed or seriously injured in the incident when the patient was burnt? (please tick one)
YES ☐ **NO** ☐ **UNSURE** ☐
(if yes or unsure, exclude and discontinue)

5) Was the burn self-inflicted?
YES ☐ **NO** ☐ **UNSURE** ☐
(if yes or unsure, exclude and discontinue)

Please see next sheet for final question

6) Does the patient have an identified or suspected history of:

a) Current drug misuse **YES** ☐ **NO** ☐

b) Alcohol induced brain damage **YES** ☐ **NO** ☐

c) A learning disability **YES** ☐ **NO** ☐

d) Dementia **YES** ☐ **NO** ☐

e) Any head injury prior to the burn injury that led to unconsciousness for any period of time. **YES** ☐ **NO** ☐

f) Psychosis or schizophrenia **YES** ☐ **NO** ☐

g) Manic depression or mania **YES** ☐ **NO** ☐

(if yes to any of 6a to 6g, exclude and discontinue)

Temporary changes in responses to burn-related material after a burn injury.

You are being invited to take part in a research study. Before you decide it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information and discuss it with others if you wish. Ask us if there is anything that is not clear or if you would like more information. Take time to decide whether or not you wish to take part.

Thank you for reading this.

What is the purpose of the study?
After a frightening experience, like receiving a burn, people can feel very upset. Some people have bad memories or nightmares about the accident and problems sleeping. Others worry that it could happen again, avoid reminders of the accident and do not want to talk about it. People can also be very jumpy, on the lookout for danger all the time and feel anxious, irritable or distant.

These symptoms are not harmful and usually fade away with time. However, if they last for more than a month then the condition is called Post-Traumatic Stress Disorder (PTSD). Often this also disappears in time but sometimes people need help from professionals to put their experience behind them.

After a frightening experience there also seems to be a temporary change in the way that some people think about things that they link with their trauma. We hope that the study will help us to understand more about this and help improve psychological theories and treatments for PTSD.

Why have I been chosen?
You have been chosen because your nurse or doctor has told us that you have had a burn and that you might want to take part in the study. 20 other people who have had burns and 20 people who have not been burnt will also take part in the study.

Do I have to take part?
It is up to you to decide whether or not to take part. If you do decide to take part you will be given this sheet to keep and asked to sign a consent form. If you decide to take part you are still free to withdraw at any time and without giving a reason. A decision to withdraw, or to not take part, will not affect the standard of care you receive.

What will happen to me if I take part?
If you wish to take part we will invite you for an appointment at the Jubilee Building at Glasgow Royal Infirmary. Stephen Marks, a Trainee Clinical Psychologist, will meet you at the building. The appointment will probably last for around one hour but one and a half hours is available if this is needed. Unfortunately we are not funded to pay for travel expenses. You will be asked to complete 5 questionnaires. The first will ask about your age, gender and number of years of education. The other four include questions about symptoms of

anxiety, depression and PTSD, and your alcohol use. However, we will not ask you to talk in detail about your accident or any problems you are experiencing. You will also be asked to listen to 4 taped one-minute long stories and later asked questions about them. Two stories will be about normal events and two will describe accidents where a person receives a burn injury. The stories about burns have already been tested to make sure that they are not too stressful to listen to. However, you can ask for the tapes to be stopped at any time. If we think that anyone becomes too upset during a session we will stop the tape.

When everyone has completed these tasks we will work out if there are any differences between people who have had burn injuries and people who have not.

What are the possible disadvantages and risks of taking part?
Each story lasts for less than a minute but most people will feel slightly uncomfortable listening to the stories about burn injuries. If you have had a burn injury you may feel a little more stressed and may be reminded of your accident for a short time. You may have noticed that you have had nervous feelings in your body at other times when you have been reminded of your accident. These are normal reactions to stress and are not dangerous. The researcher is trained to help you to calm yourself in the very unlikely event that you experience these feelings for any significant length of time at your appointment.

If you have had some symptoms of PTSD in the past then there is a very slight possibility that they will briefly return after the study. This is very unlikely. Symptoms might include: bad memories of your accident, nightmares, problems sleeping, irritability, anxiety and increased feelings of jumpiness. These should quickly pass. However, you will be given the telephone number of Dr Kim Kirkwood, a Clinical Psychologist at the Burns Unit just in case you do feel that you want advice. Information leaflets about psychological services available for people with burn injuries and general leaflets relating to anxiety, PTSD and depression will also be available.

The appointment with Stephen Marks is not a treatment session and you will not be asked to discuss what has happened to you in detail. However, if you are having difficulties coping after your accident we will be happy to pass your name on to Clinical Psychology services at the Burns Unit if you want us to. In this situation we would inform your GP and probably pass on results from your questionnaires to the psychology department. This would help them decide who would be the best person to help you. They might explain that your difficulties will pass away by themselves or offer an appointment or refer you on to someone else.

What are the possible benefits of taking part?
There will not be any benefit to your own physical or mental health from taking part in the study. However, hopefully you will be helping us to understand more about what happens to the way people think after frightening experiences. The information we gain may mean that we are more able to treat people who have had these experiences and who have PTSD.

What if new information becomes available?
We will keep a record of your contact details so that we can tell you about any new information that becomes available. We will make certain that you are told if information emerges that might affect your decision to take part or to allow your data to be used.

What if something goes wrong?
The researcher is a final-year Trainee Clinical Psychologist employed by the National Health Service (NHS). In the extremely unlikely event that you experienced significant distress because of the study, possible compensation would be the responsibility of Greater Glasgow

Primary Care Division. If the researcher breeched approved guidelines for the study compensation would be through his own professional insurance policy.

If you wish to complain, or if you have any concerns about any aspect of the way you have been approached or treated during the study, the normal NHS complaints mechanism will be available. The researcher will not be able to deal with complaints about your hospital treatment but can give you written information about standard complaints procedures.

Will my taking part in the study be kept confidential?
If you agree to take part in the study we will not have access to your medical records. All information that you give at your appointment will be kept strictly confidential throughout the course of the research. Any information about you that is taken out of the hospital will have your name and address removed so that you cannot be recognised from it.

Your GP or hospital consultant will be informed that you have agreed to take part and provided with a copy of this information leaflet.

What will happen to the results of the research study?
The study will be written-up by July 2005 and examined by the University of Glasgow. You will be provided with a written summary of the findings after any corrections have been made. The study may be published in a scientific journal and you will be informed about how you can view this. You will not be identified in any publication or report.

Who is organising and funding the research?
The study is being completed as part of a doctoral training course in Clinical Psychology with the University of Glasgow and is funded by the University.

Who has reviewed the study?
All aspects of the study have been approved by staff at the Section of Psychological Medicine at Glasgow University. Dr Liz Campbell, Course Director/ Senior Lecturer in Clinical Psychology is the main advisor for the study at the University. The study has also been given ethical approval by ethics committees from Greater Glasgow Primary Care Division, Glasgow Royal Infirmary and Gartnavel Royal Hospital.

Contact for Further Information

Stephen Marks, Trainee Clinical Psychologist 0141 211 0607
Section of Psychological Medicine
Division of Community Based Sciences, University of Glasgow
Academic Centre, Gartnavel Royal Hospital
1055 Great Western Road
Glasgow G12 0XH

Appendix 4j Patient information leaflet –
Control group participants (v.4) February
27th 2005

Temporary changes in responses to burn-related material after a burn injury.

You are being invited to take part in a research study. Before you decide it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully and discuss it with others if you wish. Ask us if there is anything that is not clear or if you would like more information. Take time to decide whether or not you wish to take part.
Thank you for reading this.

What is the purpose of the study?
After a frightening experience, like receiving a burn, people can feel very upset. Sometimes they have bad memories or nightmares about the accident and problems sleeping. They might worry that it could happen again, avoid reminders of the accident and not want to talk about it. People can also be jumpy, on the lookout for danger all the time and feel anxious, irritable or distant.

These symptoms are not harmful and usually fade away with time. However, if they last for more than a month then the condition is called Post-Traumatic Stress Disorder (PTSD). Often this also disappears in time but sometimes people need help from professionals to help them put their experience in the past.

After a frightening experience there also seems to be a temporary change in the way that some people think about things that they link with their trauma. We hope that this study will help us to understand more about this. This would help us to improve psychological theories and treatments for PTSD.

Why have I been chosen?
You have been chosen as someone who has not had a burn injury. We want to give you the same task as some people who have been burnt to see if there is any difference in the way that they respond. 20 other people who have not been burnt and 20 people who have had burns will also take part in the study.

Do I have to take part?
It is up to you to decide whether or not to take part. If you do decide to take part you will be given this sheet to keep and asked to sign a consent form. If you decide to take part you are still free to withdraw at any time and without giving a reason.

What will happen to me if I take part?
If you wish to take part we will invite you for an appointment with Stephen Marks, a Trainee Clinical Psychologist. Unfortunately we are not funded to pay for travel expenses. The appointment will probably last for less than one hour but one and a half hours is available if this is needed. You will be asked to complete 5 questionnaires. The first will ask about your age, gender and number of years of education. The other four include questions about symptoms of

anxiety, depression and PTSD, and your alcohol use. However, we will not ask you to talk in detail about any problems you are experiencing. You will then be asked to listen to 4 taped one-minute long stories and later asked questions about them. Two stories will be about normal events and two will describe accidents where a person receives a burn injury. The stories about burns have already been tested to make sure that they are not too stressful to listen to. However, you can ask for the tapes to be stopped at any time. If we thought that anyone was becoming too stressed we would stop the tape.

When everyone has completed these tasks we will work out if there are any differences between people who have had burn injuries and people who have not.

What are the possible disadvantages and risks of taking part?
Each story lasts for less than a minute but most people will feel slightly uncomfortable listening to the stories about burn injuries. This feeling should quickly pass but the researcher is trained to help you to calm yourself in the extremely unlikely event that you find the stories stressful.

It is extremely unlikely that you will have any problems after taking part in the study. However, as a required precaution, you will be given the telephone number of Dr Linda Campsie, Consultant Clinical Psychologist, who can offer advice and support if this were needed.

The appointment with Stephen Marks is not supposed to be a treatment session and you will not be asked to discuss in detail any problems that you are having in your life. If you do feel that you need help with any difficulties, you should phone your GP for an appointment. Your GP will be informed that you have agreed to take part in the study and provided with a copy of this information leaflet. Information leaflets about anxiety, PTSD and depression can also be made available for you.

What are the possible benefits of taking part?
There will not be any benefit to your own physical or mental health from taking part in the study. However, hopefully you will be helping us to understand more about what happens to the way people think after frightening experiences. The information we get from the study may mean that we are more able to treat patients who have had these experiences and who have PTSD.

What if new information becomes available?
We will keep a record of your contact details so that we can tell you about any new information that becomes available. We will make certain that you are told if information emerges that might affect your decision to take part or to allow your data to be used.

What if something goes wrong?
The researcher is a final-year Trainee Clinical Psychologist employed by the National Health Service (NHS). In the extremely unlikely event that you experienced significant distress because of the study, possible compensation would be the responsibility of Greater Glasgow Primary Care Division. If the researcher breeched approved guidelines for the study compensation would be through his own professional insurance policy.

If you wish to complain, or if you have any concerns about any aspect of the way you have been approached or treated during the study, the normal NHS complaints mechanism will be available to you. The researcher will not be able to deal with complaints about past or present treatment. However, he can give you written information about standard complaints procedures.

Will my taking part in the study be kept confidential?
If you agree to take part in the study the researcher will not have access to your medical records. All information that you give at your appointment will be kept strictly confidential throughout the course of the research. Questionnaires will not include your name and address meaning that you cannot be recognised from them.

What will happen to the results of the research study?
The study will be written-up in July 2005 and examined by the University of Glasgow. You will be provided with a written summary of the findings after any corrections have been made. The study may also be published in a scientific journal in the future. If this happens you will be told about where you can get hold of it. You will not be identified in any publication or report.

Who is organising and funding the research?
The study is being completed as part of a doctoral training course in Clinical Psychology with the University of Glasgow and is funded by the University.

Who has reviewed the study?
All aspects of the study have been approved by staff at the Section of Psychological Medicine at Glasgow University. Dr Liz Campbell, Course Director/ Senior Lecturer in Clinical Psychology is the main advisor for the study at the University. The study has also been given ethical approval by ethics committees from Greater Glasgow Primary Care Division, Glasgow Royal Infirmary and Gartnavel Royal Hospital.

Contact for Further Information

Stephen Marks, Trainee Clinical Psychologist 0141 211 0607
Doctorate in Clinical Psychology
Section of Psychological Medicine
Division of Community Based Sciences
University of Glasgow
Academic Centre, Gartnavel Royal Hospital
1055 Great Western Road
Glasgow G12 0XH

Temporary changes in responses to burn-related material after a burn injury.

NHS Greater Glasgow

Thank you for reading this. Can you help us?

After a frightening experience, like receiving a serious burn, people can feel very upset. There also seems to be a temporary change in the way that some people think about things that they link with their accident. We hope that this study will help us to understand more about this and help us to improve psychological theories and treatments for those who are affected by all kinds of *traumatic* experiences *(such as accidents, assaults and life-threatening illnesses).*

You can help us to do this if you decide to take part.
However, the decision is entirely up to you and you are free to withdraw at any time, without giving a reason.

What will I be asked to do if I decide to take part?
If you wish to take part we will invite you for a 1hour long appointment although extra time is available if needed. Unfortunately we are not funded to pay for travel expenses. You will be asked to complete some questionnaires about symptoms of anxiety, depression and a stress disorder that sometimes develops after *traumatic* experiences. However, we will not ask you to talk in detail about any problems you are experiencing. *If you have lived through a traumatic experience you may wish to keep it private and chose not to take part in the study. This is completely up to you. You do not need to give any reason for your decision and will not be asked for one. If you do take part* you will also be asked to listen to 4 taped short stories and later asked questions about them. Two stories will be about normal events and two will describe accidents where a person receives a burn injury. The stories about burns have been checked over to make sure that they are not too distressing to listen to. However, you can ask for the tapes to be stopped at any time. The researcher is a Trainee Clinical Psychologist and is trained to help you if you did feel upset.

When everyone has completed these tasks we will work out if there are any differences between people who have had burn injuries and people who have not.

Other information
Information leaflets about stress and depression will be made available.

The study is being completed as part of a training course in Clinical Psychology with the University of Glasgow. It is funded by Greater Glasgow Primary Care NHS Trust and has been approved by Glasgow University and National Health Service ethics committees.

If you wish to take part, or for further information, please contact:
Stephen Marks, Trainee Clinical Psychologist 0141 211 0607
Doctorate in Clinical Psychology
Section of Psychological Medicine
University of Glasgow
Academic Centre, Gartnavel Royal Hospital
1055 Great Western Road, Glasgow, G12 0XH

Appendix 4l Self-certification form for potential members of the control group relating to exclusion criteria (v.2, February 27th 2005)

1. Have you ever experienced a burn that damaged an area of skin larger than a little finger?

YES ☐ **NO** ☐ **UNSURE** ☐

If unsure, please describe what part of your body was burnt.

.....

.....

2. Please tick yes if you suffer from or have experienced any of the difficulties listed below.

YES ☐ **NO** ☐

Drug misuse A learning disability

A head injury that led to unconsciousness for any period of time.

A history of mental illness (psychosis or schizophrenia, does not include mental health problems like depression and anxiety).

Manic depression or mania Dementia

If you have put ticks in both "no" boxes then please return the form to Stephen Marks via the Freepost envelope provided.

If you have put a tick in the "no" box for question 2 but a tick in the "unsure" box for question 1 then please return the form to Stephen Marks via the Freepost envelope provided.

Unfortunately, **if you have put a tick in the "yes" box** for either question 1 or 2 we cannot include you in the study. This is because your life experiences might affect the results and prevent us from being certain about the study conclusions. If this happens then we cannot use the study findings to help people who have experienced burn injuries.
If you have put a tick in a "yes" box then please destroy the form. You do not need to contact the researcher and will not be asked why you are not taking part.
Thank you very much for considering taking part in this study.

Appendix 4m Ethical considerations regarding recruitment of controls

Questionnaires did not require disclosure of specific details of medical and trauma histories but participants could have volunteered this information. Procedures were therefore implemented to ensure that individuals were aware that disclosures were not required. This ensured that individuals could avoid discussing any issues that they preferred to keep private, without drawing the researcher's attention. The approach was in keeping with BPS guidelines (Ethical Principles for conducting Research with Human Participants, BPS 2006 section 8.3).

Recruitment generally

The researcher only discussed the study with potential participants after they had viewed information explaining what was involved in the study and potential issues that might arise, and after the individual had requested further contact. Individuals were then asked to post an opt-in slip to the researcher if they wished to participate but could chose not to do this without volunteering a reason.

Following participation

Individuals were given the contact telephone number of an independent Clinical Psychologist should they experience study-related distress but no participant requested this input.

Control pre-participation forms

With respect to medical exclusion criteria forms and opt-ins for control participants, individuals only returned these if they did not meet exclusion criteria or if they were willing to discuss any factors that might exclude them from the study. Hence individuals could exclude themselves because of their medical histories without the researcher being aware of the reason for their decision.

Potential disclosure of trauma histories

Patient information leaflets approved by ethics explained that participants would be given PTSD questionnaires but did not directly state that they would be asked about trauma histories. However, following discussion with the researcher supervisor, it was agreed that this possibility should be raised because the PDS asks whether participants have experienced other traumas. The issue was highlighted to controls through recruitment posters and was emphasised verbally to all individuals prior to participation and administration of the PDS (Posters for burn-injured participants were not altered as they were recruited by nurses distributing information packs). During administration of the PDS, participants were also reminded that any questions relating to disclosed traumas would be restricted to identification of trauma type and current symptoms. Individuals therefore had opportunities to avoid disclosure of trauma histories, if they wished, without this being evident to the researcher. This strategy could have led individuals to conceal trauma histories but it protected participants' privacy.

All participants were therefore told explicitly that they did not have to provide disclosures and posters were modified slightly to highlight this issue to controls. These measures were deemed to be sufficient safeguard in discussion with the research supervisor (cf BPS 2006 section 8.3).

Participant Identification Number for this trial:

CONSENT FORM - Burn injured group (v.2 September 20th 2004)

Title of Project: Temporary changes in responses to burn-related material after a burn injury.

Name of Researcher: Stephen Marks, Trainee Clinical Psychologist

Please initial each box

1. I confirm that I have read and understand the information sheet dated May 17th 2005 (version 4) for the above study and have had the opportunity to ask questions. ☐

2. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason, and without my medical care or legal rights being affected. ☐

3. I understand that my response to the study task will be recorded on to an audio cassette, which will be kept by the researcher. I hereby give my permission for my voice to be recorded. ☐

4. I understand that some of my comments may be included in the written report of this study. I understand that if this does occur, my name will not be reported and any information that could be used to identify me will be removed. I hereby give my permission for my comments to be used in this manner. ☐

5. I agree to take part in the above study. ☐

Name (please print)	Date	Signature
Researcher	Date	Signature

1 for patient; 1 for researcher; 1 to be kept with hospital notes

Patient Identification Number for this trial:

CONSENT FORM - Control group (v.2 September 20th 2004)

Title of Project: Temporary changes in responses to burn-related material after a burn injury.

Name of Researcher: Stephen Marks, Trainee Clinical Psychologist

Please initial each box

1. I confirm that I have read and understand the information sheet dated, May 17th 2005 (version 4) for the above study and have had the opportunity to ask questions. ☐

2. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason, and without my medical care or legal rights being affected. ☐

3. I understand that my response to the study task will be recorded on to an audio cassette, which will be kept by the researcher. I hereby give my permission for my voice to be recorded. ☐

4. I understand that some of my comments may be included in the written report of this study. I understand that if this does occur, my name will not be reported and any information that could be used to identify me will be removed. I hereby give my permission for my comments to be used in this manner. ☐

5. I agree to take part in the above study. ☐

Name (please print)	Date	Signature
Researcher	Date	Signature

1 for patient; 1 for researcher; 1 to be sent to GP

Appendix 4o Order of presentation of passages for both groups.

Participant	1st Passage	2nd Passage	3rd Passage	4th Passage
A	N1	T1	N2	T2
B	N1	T1	T2	N2
C	N1	T2	T1	N2
D	N1	N2	T2	T1
E	N2	N1	T1	T2
F	N2	N1	T2	T1
G	T1	N1	N2	T2
H	T1	N1	T2	N2
I	T1	N2	T2	N1
J	T2	N1	N2	T1
K	T2	N2	N1	T1
L	T2	N1	T1	N2
M	N2	T1	N1	T2
Control Group only N	T2	N2	T1	N1
Control Group only O	N2	T2	T1	N1

N1 = Neutral 1
N2 = Neutral 2
T1 = Trauma 1
T2 = Trauma 2

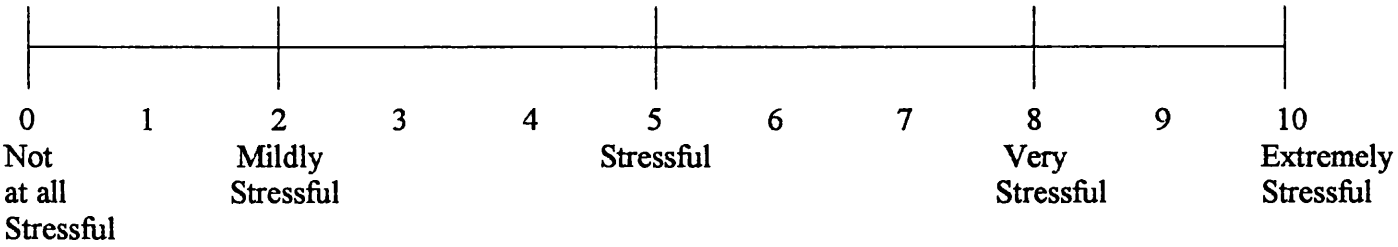
Appendix 4p Passage rating task – Control participants (v.1) February 22nd 2005

Passage rating task

The four passages that you have just listened to are shown below in print.

Using the scale provided please rate how stressful it was for you to listen to each passage. For example, you might have found that it was "not at all stressful" and you would write down "0" next to that passage. However, if you found that it was "very stressful" listening to a passage and "you could barely stand it", you could write down 8 or whichever number you wish to choose.

How stressful was it for you to listen to the passage?



5 - Stressful – It was unpleasant, but bearable.
8 -Very Stressful – I could barely stand it.
10 - Extremely Stressful - I felt more stressed than I have ever felt.

Using the scale provided please rate how stressful it was for you to listen to this passage. .....

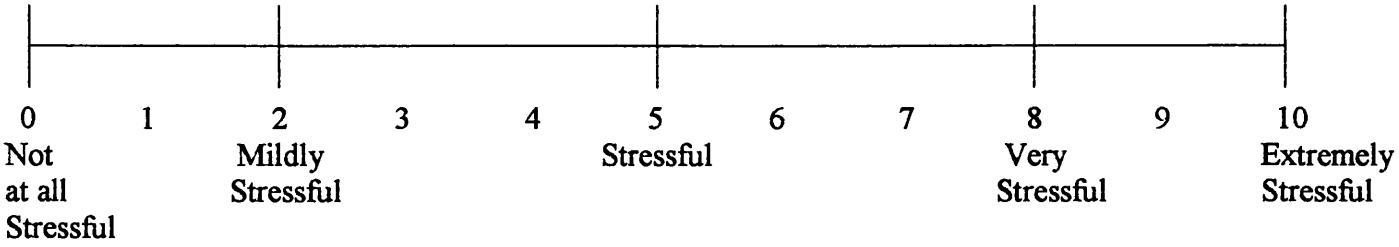
Appendix 4q Passage rating task –
Burn injured participants (v.1)
February 22nd 2005

Passage rating task

The four passages that you have just listened to are shown below in print.

a) Using the scale provided please rate how stressful it was for you to listen to each passage. For example, you might have found that it was "not at all stressful" and you would write down "0" next to that passage. However, if you found that it was "very stressful" listening to a passage and "you could barely stand it", you could write down 8 or whichever number you wish to choose.

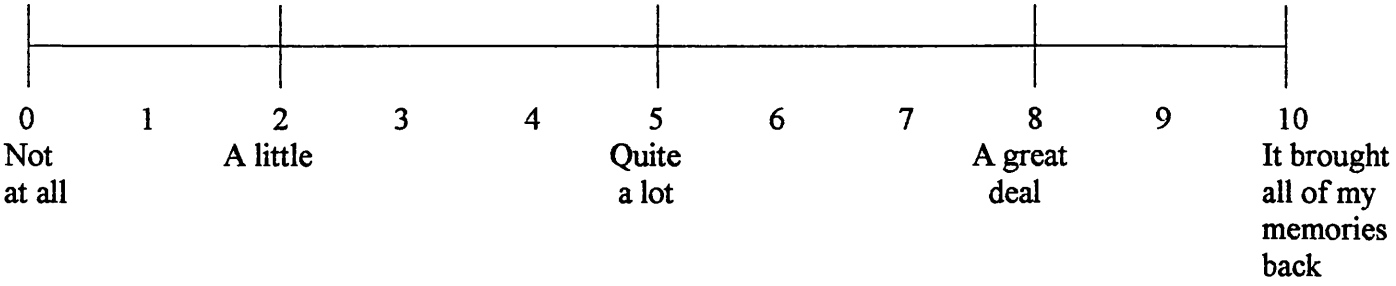
How stressful did you find the passage to listen to?



5 - Stressful – It was unpleasant, but bearable.
8 -Very Stressful – I could barely stand it.
10 - Extremely Stressful - I felt more stressed than I have ever felt.

b) Using the second scale provided please also rate how much the passage reminded you of your own burn injury. For example, you might have found that the passage did not remind you of your own burn injury at all and you would write down "0" next to that passage. However, if you found that the passage reminded you a "great deal" of your burn injury, you could write down 8 or whichever number you wish to choose.

How much did the passage remind you of your own burn injury?



a) Using the scale provided please rate how stressful it was for you to listen to this passage. .....

b) Using the second scale provided please also rate how much this passage reminded you of your own burn injury.....

Appendix 4r(i) Information for burn-injured participants who have completed the research task (v2, February 22nd 2005)

Thank you very much for taking part in this research study.

I hope that you did not find the experience too difficult. Thank you for putting yourself through the task.

We hope that your efforts will help us to improve psychological treatments for people who have experienced a whole range of different kinds of frightening experiences, including other people who have been burnt.

The aim of the study is to try to work out if people with burn injuries find it easier or harder to remember the burn stories, compared to the neutral stories and compared to people who have not been burnt. This should help us understand more about why symptoms of post-traumatic stress sometimes take time to get better. It may also help us to work out when it is best to use two different kinds of psychological treatment to help people. If you want more information about this then please contact Stephen Marks on 0141 211 0607.

What do I do if I feel upset after the task?
Listening to the stories may remind of your accident for a short time. If you feel upset these feelings should soon pass but please talk about them if you feel you need to. Speaking to friends or relatives may be helpful. Also relaxing by listening to music, reading a book, taking a bath or doing some light exercise might help you feel calmer.

What if I want to speak to someone?
If you are feeling upset after the task and you want to speak to a health professional then you can telephone Dr Kim Kirkwood, Clinical Psychologist at the burns unit on **0141 211 5639**. She may not be able to get back to you straight away but can call you back if you leave your telephone number. Alternatively you could arrange to see your GP, as they will have been informed about you taking part in the study. Stephen Marks can be contacted on 0141 211 0607 but will only be able to collect messages on a weekly basis.

What if I am having anxiety symptoms?
You may have noticed that you have had nervous feelings in your body at other times when you have been reminded of your accident. Common symptoms include your heartbeat and breathing getting faster, butterflies in the stomach, tense muscles, feeling hot and sweaty, and sometimes feeling dizzy or a little sick. These are normal reactions to stress and are not dangerous. If they do occur after the task they will pass because our bodies always protect themselves by shutting off the stress response when it reaches a certain point. However, if you are worried about this then please speak to friends, relatives or Dr Kirkwood.

What if I start thinking about my own accident or start having symptoms like nightmares, bad memories or problems sleeping?
If you have had symptoms of Post-traumatic Stress before there is a slight possibility that these might come back for a short time after you take part in the study. This is unlikely. Symptoms could include: bad memories of your accident, nightmares, problems sleeping, irritability, and increased feelings of jumpiness. These should quickly pass and are not in themselves physically dangerous. However, you can telephone Dr Kim Kirkwood if you do feel upset and want advice.

Appendix 4r(ii) Information for control participants who have completed the research task (v2, February 22nd 2005)

Thank you very much for taking part in this research study.

I hope that you did not find the experience too difficult. Thank you for putting yourself through the task.

We hope that your efforts will help us to improve psychological treatments for people who have experienced a whole range of different kinds of frightening experiences, including people who have been burnt.

The aim of the study is to try to work out if people with burn injuries find it easier or harder to remember the burn stories, compared to the neutral stories and compared to people who have not been burnt. This should help us to understand more about why symptoms of post-traumatic stress sometimes take time to get better. It may also help us to work out when it is best to use two different kinds of psychological treatment to help people. If you want more information about this then please contact Stephen Marks on 0141 211 0607.

What do I do if I feel upset after the task?
There is a slight possibility that people may feel upset after listening to the stories. If this does happen then these feelings should soon pass but please talk about them if you feel you need to. Speaking to friends or relatives may be helpful. Also relaxing by listening to music, reading a book, taking a bath or doing some light exercise might help you feel calmer.

What if I want to speak to someone?
If you are feeling upset after the task and you want to speak to a health professional then you can telephone Dr Linda Campsie, Consultant Clinical Psychologist on **0141 211 0030**. She may not be able to get back to you straight away but can call you back if you leave your telephone number. Alternatively you could arrange to see your GP, as they will have been informed about you taking part in the study. Stephen Marks can be contacted on 0141 211 0607 but will only be able to collect messages on a weekly basis.

What if I am having anxiety symptoms?
You may have noticed that you have had nervous feelings in your body at other times when you are feeling anxious. Common symptoms include your heartbeat and breathing getting faster, butterflies in the stomach, tense muscles, feeling hot and sweaty, and sometimes feeling dizzy or a little sick. These are normal reactions to stress and are not dangerous. If they occur after the task they will pass because our bodies always protect themselves by shutting off the stress response when it reaches a certain point. However, if you are worried about this then please speak to friends, relatives or Dr Campsie.

Appendix 4s(i) Passage marking schemes

Dan Freeman

Story Unit	Scoring criteria	Example of a 1-point response	Example of a 0-point response
At 8.00	8.00 is required		Any time other than 8.00
on Tuesday	Tuesday is required		Any day other than Tuesday.
morning	Morning (in any context)	In the morning, __ a.m. (any hour)	Daytime, afternoon, evening
Dan	Dan or variant of the name.	Daniel, Danny.	Den, David, John.
Freeman	Freeman is required		Freemantle, Fraser
of Portsmouth	Portsmouth is required		Any city other than Portsmouth.
	Indication of a main character who is male.	He, the man, the guy.	Someone, a person.
was travelling to work	Indication that he was making a journey to work.	Travelling, going, on the way.....to work, his employment, his job	On, driving, travelling without indication of destination
on the bus.	Bus is required		Any other form of transport
	Indication that the character was on a purposeful journey	He was going to work, travelling somewhere	He was on a bus/driving without reference to a destination
There were road works on the route and	Indication that the route was blocked by road works	There are/were road works on the journey, They were digging up the road	He saw some road works, They were digging up a road
	Indication of road works	There were road works	There was a traffic jam
the traffic had taken 10 minutes	Indication of a slowing of the traffic for 10 minutes	The traffic/cars/He had been held up/stuck in traffic for 10 minutes	He had been in traffic /travelling for 10 minutes without mention of delay
to cover the last 200 metres.	Indication that the delay took place over the last 200 metres	The last/previous 200 metres, during the last 200 metres/yards	For 200 metres, for the last part of the journey
	Indication that the journey had been delayed	He had been held up/delayed	He was running late without reference to external cause
The windows	Windows is required		The windscreen,
had fogged up,	Indication that condensation had obscured the view out of the windows	Fogged(ing)/ steamed/misted up or over. Condensation had obscured the view	He could not see. There was condensation on the windows
there was nowhere to sit	Indication that there were no seats	All the seats had gone, no seats are/were free	He had to stand up (without indication of reason), he did not sit

Story Unit	Scoring criteria	Example of a 1-point response	Example of a 0-point response
and the brakes were making	Reference to the brakes producing a consequence	Coming from the brakes	The bus braked
an unpleasant	Indication of something unpleasant	Nasty, horrible	
screeching noise.	Screeching noise is required		A noise. Screeching.
	Indication of nature of situation	Unpleasant/crowded, uncomfortable bus or reference to noise or windows	He did not like the bus
Dan chose	Indication that he made a decision	Dan/He decided(s),	Dan/He got off.
to walk	Walk or walked is required		Went. Ran. Strode.
for the rest of the journey.	Indication to the remainder of the journey	For the rest of the way to work, to work	No reference to duration or termination of journey.
	Indication that the character chose not to remain on the bus	He got off the bus. He walked instead	When he got off the bus....
He stepped onto the pavement,	Indication that he stepped or walked towards or on the pavement	He stepped(s) down/ walked to/on the pavement/ sidewalk	He got off, he went to the edge of the road, he stood on the pavement
put his hands in his pockets	Indication that he moved his hands into his pockets	Put(s) his hands in his trouser/shirt/jacket pocket(s)	Folded/rubbed his hands,
and hummed	Hummed(s) or humming is required		Sang/whistled
to himself	Indication that he produced a musical noise in his imagination or quietly	He sang/whistled/ hummed...quietly/in his head/ to himself	He sang/whistled out loud or without reference to low volume
as he strode ahead.	Indication that he walked purposefully	He marched(es), forged forwards,	He walked to work
	Indication of the character's other activity when walking	He sang as he walked. He looked around as he walked.	He walked very quickly.

Simon Jones

Story Unit	Scoring criteria	Example of a 1-point response	Example of a 0-point response
At 2.00	2.00 is required		Any time other than 2.00
on Sunday	Sunday is required		Any day other than Sunday.
afternoon	afternoon (in any context)	In the afternoon, __ p.m. (any hour)	Daytime, morning, evening
Simon	Simon or variant of the name.	Simon, Si.	Sinbad, Stuart, Michael.
Jones	Jones is required		James, Jordan
of Bristol	Bristol is required		Any city other than Bristol.
	Indication of a main character who is male.	He, the man, the guy.	Someone, a person.
was watching football	Indication that he was watching football.	He was/is watching football/the football	Watching the game/ any other sport
on television	Television is required		On the radio, watching but without indication of a television
with friends.	Indication that friends were present	With his mates/pals,	At home, at his friends' house
	Indication that the character was watching sport	He was watching the game, a sports programme	He was watching television
He ran into the kitchen	Indication that he ran into the kitchen	He sprinted(s), rushed, runs to/into/through to the kitchen	He walked, he went to the kitchen. He ran to another room or to the cooker.
where some chips were frying,	Indication that chips were cooking in the room	Where some/and some chips… Were/are deep-frying/ cooking	Where there were some chips without reference to cooking. Where some food was cooking.
	Indication that the main character moved into the kitchen	He went to the kitchen	He was in the kitchen
but tripped	Tripped is required		Fell
knocking over the pan.	Indication that the character knocked the pan	Knocked/dislodged(s) the pan/pot/chips/saucepan	Knocked oil onto him, knocked the kettle
	Indication that the character fell	He fell over, tripped	He knocked the oil
He screamed in agony	Indication that the character screamed in pain	He cried/(s) in pain,	He was in agony or he screamed (only)
as the boiling oil	Reference to hot oil or fat	Hot fat or oil	Boiling liquid or fat/oil without reference to heat

Story Unit	Scoring criteria	Example of a 1-point response	Example of a 0-point response
poured over him	Indication that the oil poured over him	Spilt on him, fell over him, splashed(s) over his clothes	Fell on the floor
and his skin began to melt.	Description of his skin scalding	His skin melted(s), shrivelled up, melting his skin,	He was burnt. His clothes melted.
	Indication that hot liquid fell on him	He was covered in hot fat	He was burnt by oil
Simon stared	Indication that he looked at his arm	He looked(s) down, could not take his eyes off, he saw/sees... his arm/skin	His arm was
at his raw reddened	Raw is required and/or reddened or a variant	Raw, reddened, red	Painful Black or another colour that is not red
blistering arm	Blistering and arm are required		Burnt arm
	Description of damage to his arm/skin.	His arm was scalded/burnt, his skin blistered	He was burnt
and tried to peel off his t-shirt	Indication of attempts to remove his t-shirt or shirt	He took/takes off, he tries to remove, peel from....his shirt. His friends tried to take his t-shirt off.	He pulled at his t-shirt...without indication of an attempt to remove. He tried to take off his coat.
but it stuck to him	Indication that the clothing stuck to him	It stuck/sticks to him/his skin	It was stuck
pulling at his skin	Indication that the clothing pulled at his skin	It pulled/tore/tears his skin off	He could not get it off
	Indication that he was unable to remove clothing	His clothes stuck to him, his clothes would not come off	He left his clothes on
His friend dowsed him with water	Indication that water was poured over him by another individual	His mate/pal(s), someone, threw/ poured(s) water on him	His friend got some water.
and telephoned for an ambulance	Indication that a phone call was made and Ambulance is required	Rang/rings, phoned, called for an ambulance	Went to get an ambulance, telephoned 999/for help
	Indication that his friend assisted him	His mate helped him	He [Simon] called for an ambulance

Jane Tomkinson

Story Unit	Scoring criteria	Example of a 1-point response	Example of a 0-point response
At 10.00	10.00 is required		Any time other than 10.00
on Friday	Friday is required		Any day other than Friday.
evening	evening (in any context)	In the evening, __ p.m. (any hour after 6.00)	Daytime, morning, afternoon
Jane	Jane or variant of the name.	Jane, Janie.	Janette, Janice, Margaret.
Tomkinson	Tomkinson is required		Tomlinson, Thomson
of Newcastle	Newcastle is required		Any city other than Newcastle.
	Indication of a main character who is female.	She, the woman, the lady.	Someone, a person.
was chatting enthusiastically	Indication that she was chatting.	She was/is having a good chat, chatting to friends	She was talking
at a party	Party is required		At friends
	Indication that the character was at a party	She was at a party	She was with friends. She was partying.
She was standing	Indication that she was standing	She was/is stood, standing up	She was sitting, near
next to lit candles	Next to or a variant and candles is required	Nearby, near, adjacent to, close to...burning candles or candles (only)	On, and there were..... candles. Next to.... a fire, a flame,
and was unaware that	Indication that she was unaware of the situation	She did not know, could not see, she is unaware	She saw, heard
her clothes were igniting.	Indication that her clothes/or an article of clothing were igniting	Her clothes/dress was/is catching fire, on fire	Her hair was catching fire. Her dress was burnt.
	Indication of dangerous proximity to flames	She was near lit candles	There were candles
Her synthetic dress	Dress is required		Her clothes
burst into flames	Indication that flames were present	It went up in flames, she was/is covered in flame	Her clothes were on fire
she was on fire	Indication that she was on fire	She was/ is on fire	She is burnt/ in flames
	Indication of her clothes burning	Her clothes went up in flames. The candle lit her dress.	She was on fire.

Story Unit	Scoring criteria	Example of a 1-point response	Example of a 0-point response
her legs and back were burning	Indication that the back of her body was burning	Her legs and her back were burning, the fire went up her back, there were flames at the back of her body	Her face or chest or any part of the front of the body was burning. Her leg and back were injured.
she smelt and heard	Indication of the character detecting a smell and/or a sound	She could/can smell or hear	She saw, she felt
her hair singeing	Indication that her hair was singeing or a variant	Her hair was burnt/ burning, singed, singes her hair	Her hair was on fire, in flames
	Reference to the effects of the fire on body parts	It burnt her hair	She was burnt
Jane was terrified	Indication of extreme fear	She is/was terrified, very frightened/scared	She was scared/worried
screamed in panic	Indication that she screamed and panicked	She cried/called(s) out with fear/panic	She was panicking or she screamed (only)
and ran frantically	Indication that she ran frantically	She ran/runs around desperately or in a panic	She ran around
trying to get away from the fire	Indication that she was attempting to remove herself from contact with the fire	She tried(s) to get out of the fire	She tried to escape
but she could not escape	Indication that she was unable to escape	She could not/cannot escape/get away from it	She was trapped,
	Indication of fear and an attempt to escape	She panicked and tried to put the fire out	She panicked or she tried to escape only. She ran away.
Her partner wrapped her in a rug	Indication that her *partner* or variant placed a *rug* or variant around her	Her bloke, husband, partner, boyfriend.... wrapped(s) her up, rolled her, covered her with...a carpet/rug blanket/towel	Her friend wrapped her in a rug.... Her partner threw a rug at her... wrapped her in a coat or other article of clothing
and called for assistance	Indication that he sought assistance	He got/went for help, he shouted for help, calls for help	He needed help, he called an ambulance
	Indication that her partner assisted her	He helped her.	She wrapped herself in a rug.

	Score 0 or 1		
e Grant	**Story Unit**	**Thematic Unit**	**Scoring criteria**
6.00			*6.00* is required
Monday			*Monday* is required
ening,			*evening* (in any context)
:			*Joe* or variant of the name
ant			*Grant* is required
Liverpool			*Liverpool* is required
			indication of a main character who is male
is watching television			indication that he was watching/listening to the television
he dressed			indication that he was getting dressed
go out.			indication that he was going out
			indication that the character was preparing to leave
weather report			indication that there was an announcement about the weather
errupted the programme			indication of a break in the regularly scheduled programme
			indication of a weather announcement
warn that thunderstorms			indication that there was a warning about a storm
uld move into the area			indication that the storm was coming
			indication of a storm moving into the area
thin the next 2 to 3 hours			a phrase meaning about 2 to 3 hours
l remain until morning			indication that the storm would stay until morning
			indication of storm duration
e announcer said			indication that someone was reporting about a storm
storm could bring hail			indication that hail was possible
l up to 4 inches			*4 inches* is required
rain			*rain* is required
l cause the temperature to p			indication that the temperature would drop or decrease
15 degrees			a relative decrease of 15 degrees is required
			indication of storm's activity
decided to stay home.			indication that he decided to stay home
			indication that the character decided to stay in
took off his coat			indication that he took off outer clothing
l sat down			indication that he was sitting down
watch old films.			indication of viewing films is required
			indication that the character decided to watch a film or TV
call unit score	/25	/8	**Recall thematic unit score**

	Score 0 or 1		
n Freeman	**Story Unit**	**Thematic Unit**	**Scoring criteria**
8.00			*8.00* is required
Tuesday			*Tuesday* is required
rning,			*morning* (in any context)
n			*Dan* or variant of the name.
eman			*Freeman* is required
Portsmouth			*Portsmouth* is required
			indication of a main character who is male.
s travelling to work			indication that he was making a journey to work.
the bus.			bus is required
			indication that the character was on a purposeful journey
rc were road works on the te and			indication that the route was blocked by road works
			indication of road works
traffic had taken 10 minutes over			indication of a slowing of the traffic for 10 minutes
last 200 metres.			indication that the delay took place over the last 200 metres
			indication that the journey had been delayed
windows			*windows* is required
fogged up,			indication that condensation had obscured the view out of the windows
re was nowhere to sit			indication that there were no seats
the brakes were making			reference to the *brakes* producing a consequence
npleasant			indication of something unpleasant
eeching noise.			*screeching noise* is required
			indication of nature of bus journey
chose			indication that he made a decision
valk			*walk* or *walked* is required
the rest of the journey.			indication to the remainder of the journey
			indication that the character chose not to remain on the bus
stepped onto the pavement,			indication that he stepped or walked towards or on the pavement
his hands in his pockets			indication that he moved his hands into his pockets
hummed			*hummed*(s) or *humming* is required
imself			indication that he produced a musical noise in his imagination or quietly
e strode ahead.			indication that he walked purposefully
			indication of the character's other activity when walking
all unit score	/25	/7	**Recall thematic unit score**

	Score 0 or 1		
mon Jones	**Story Unit**	**Thematic Unit**	**Scoring criteria**
2.00			*2.00* is required
Sunday			*Sunday* is required
ernoon			*afternoon* (in any context)
mon			*Simon* or variant of the name.
nes			*Jones* is required
Bristol			*Bristol* is required
			indication of a main character who is male.
ıs watching football			indication that he was watching football.
television			*television* is required
th friends.			indication that friends were present
			indication that the character was watching sport
ran into the kitchen			indication that he ran into the kitchen
ıere some chips were frying,			indication that chips were cooking in the room
			indication that the main character moved into the kitchen
t tripped			*tripped* is required
ocking over the pan.			indication that the character knocked the pan
			indication that the character fell
screamed in agony			indication that the character screamed in pain
the boiling oil			reference to hot *oil* or fat
ured over him			indication that the oil poured over him
d his skin began to melt.			indication that his skin was scalded
			indication that hot liquid fell on him
mon stared			indication that he looked at his arm/skin
his raw reddened			*raw* is required and/or *reddened* or a variant
stering arm			*blistering* and *arm* are required
			description of damage to his arm/skin.
d tried to peel off his t-shirt			indication of attempts to remove his t-shirt or shirt
t it stuck to him			indication that the clothing stuck to him
lling at his skin			indication that the clothing pulled at his skin
			indication that he was unable to remove clothing
s friend dowsed him with ıter			indication that water was poured over him by another individual
d telephoned for an ıbulance			indication that a phone call was made and *ambulance* is required
			indication that his friend assisted him
call unit score	/25	/8	**Recall thematic unit score**

	Score 0 or 1		
ne Tomkinson	**Story Unit**	**Thematic Unit**	**Scoring criteria**
10.00			*10.00* is required
Friday			*Friday* is required
ening			*evening* (in any context)
ne			*Jane* or variant of the name.
mkinson			*Tomkinson* is required
Newcastle			*Newcastle* is required
			indication of a main character who is female.
s chatting enthusiastically			indication that she was chatting.
a party			*party* is required
			indication that the character was at a party
c was standing			indication that she was standing
ct to lit candles			*next to* or a variant and *candles* is required
l was unaware that			indication that she was unaware of the situation
clothes were igniting.			indication that her clothes/or an article of clothing were igniting
			indication of dangerous proximity to flames
r synthetic dress			*dress* is required
rst into flames			indication that flames were present
was on fire			indication that she was on fire
			indication of her clothes burning
legs and back were burning			indication that the back of her body was burning
smelt and heard			indication of the character detecting a smell and/or a sound
hair singeing			indication that her hair was singeing or a variant
			reference to the effects of the fire on body parts
ic was terrified			indication of extreme fear
eamed in panic			indication that she screamed and panicked
l ran frantically			indication that she ran frantically
ing to get away from the fire			indication that she was attempting to remove herself from contact with the fire
she could not escape			indication that she was unable to escape
			indication of fear and an attempt to escape
r partner wrapped her in a			indication that her *partner* or variant placed a *rug* or variant around her
l called for assistance			indication that he sought assistance
			indication that her partner assisted her
call unit score	/25	/7	**Recall thematic unit score**

Appendix 4t Kolmorogov-Smirnov tests for MRP variables

Psychological variables

One-Sample Kolmogorov-Smirnov Test

		IES Total	PDS Total	HADS - anxiety	HADS - depression	Audit
N		28	28	28	28	27
Normal Parameters(a,b)	Mean	11.43	7.00	6.07	3.39	6.22
	Std. Deviation	16.963	11.988	4.602	3.685	5.846
Most Extreme Differences	Absolute	.250	.280	.141	.254	.212
	Positive	.226	.269	.141	.254	.212
	Negative	-.250	-.280	-.094	-.179	-.144
Kolmogorov-Smirnov Z		1.324	1.480	.744	1.346	1.104
Asymp. Sig. (2-tailed)		.060	.025	.637	.053	.175

a Test distribution is Normal.
b Calculated from data.

Stress ratings

One-Sample Kolmogorov-Smirnov Test

		StressRate
N		54
Normal Parameters(a,b)	Mean	1.38
	Std. Deviation	1.861
Most Extreme Differences	Absolute	.252
	Positive	.252
	Negative	-.229
Kolmogorov-Smirnov Z		1.854
Asymp. Sig. (2-tailed)		.002

a Test distribution is Normal.
b Calculated from data.

Stress ratings transformed log (10) (k – stress rating)

One-Sample Kolmogorov-Smirnov Test

		StressLOG(10)
N		54
Normal Parameters(a,b)	Mean	.7919
	Std. Deviation	.18792
Most Extreme Differences	Absolute	.277
	Positive	.277
	Negative	-.230
Kolmogorov-Smirnov Z		2.036
Asymp. Sig. (2-tailed)		.001

a Test distribution is Normal.
B Calculated from data.

Salience ratings

One-Sample Kolmogorov-Smirnov Test

		Salience
N		24
Normal Parameters(a,b)	Mean	1.9792
	Std. Deviation	2.68036
Most Extreme Differences	Absolute	.270
	Positive	.270
	Negative	-.230
Kolmogorov-Smirnov Z		1.322
Asymp. Sig. (2-tailed)		.061

a Test distribution is Normal.
B Calculated from data.

Recall all participants

One-Sample Kolmogorov-Smirnov Test

		Recall
N		56
Normal Parameters(a,b)	Mean	51.1786
	Std. Deviation	11.91959
Most Extreme Differences	Absolute	.163
	Positive	.089
	Negative	-.163
Kolmogorov-Smirnov Z		1.222
Asymp. Sig. (2-tailed)		.101

a Test distribution is Normal.
b Calculated from data.

Recall following exclusion of two burn-injured participants with outlying Audit scores

One-Sample Kolmogorov-Smirnov Test

		Recall
N		50
Normal Parameters(a,b)	Mean	52.2800
	Std. Deviation	11.37853
Most Extreme Differences	Absolute	.191
	Positive	.094
	Negative	-.191
Kolmogorov-Smirnov Z		1.352
Asymp. Sig. (2-tailed)		.052

a Test distribution is Normal.
b Calculated from data.

Subgroup participants' recall

One-Sample Kolmogorov-Smirnov Test

		Recall
N		54
Normal Parameters(a,b)	Mean	51.4444
	Std. Deviation	12.05908
Most Extreme Differences	Absolute	.168
	Positive	.095
	Negative	-.168
Kolmogorov-Smirnov Z		1.237
Asymp. Sig. (2-tailed)		.094

a Test distribution is Normal.
b Calculated from data.

Appendix 4u Factor scores for PDS and IES-R for the burn-injured and control groups.

Measure	Burn-injured group (n = 13) m (sd)	Control group (n = 15) m (sd)
PDS Criteria B (re-experiencing)	3.38 (3.91)	0.47 (0.99)
PDS Criteria C (avoidance)	6 (6.73)	0.6 (1.4)
PDS Criteria D (arousal)	4.15 (5.06)	0.33 (0.82)
IES-R - Intrusion	7.54 (6.77)	1.53 (3.48)
IES-R - Avoidance	6.62 (7.99)	1.27 (2.84)
IES-R - Hyperarousal	6.69 (6.1)	0.47 (1.3)

Appendix 4v Trauma histories of participants

Using the IES-R cut-off recommended by Creamer et al (2003), PTSD diagnostic status was indicated for only 3 (23.1%) burns survivors and no controls. The IES-R mean total score for the burn-injured group was therefore below case levels.

The pattern of PDS responses was compatible with PTSD diagnostic criteria for five (38.46%) of the burn-injured group, with symptom severities in the "moderate" (1 individual), "moderate to severe" (3 individuals) and "severe" (1 individual) ranges. Of the other 8 burns survivors, one reported no symptoms, one had a "moderate" level of posttraumatic symptoms and six had "mild" severities with five of this sub-group reporting fewer than three symptoms. In a sub-section of the PDS nine burns survivors reported "severe" life interference in association with their trauma, one reported "moderate" interference and three denied any current trauma-related life interference.

Amongst the burn injured group, seven participants had experienced at least one other trauma including one individual who had recovered emotionally from a severe burn 20 years earlier and three individuals who had been exposed to three or more traumas in total. All secondary traumas either no longer troubled the individual or were associated with fewer PTSD symptoms on the PDS than recent burn injuries.

Ten control individuals had been exposed to at least one traumatic event. No control participants had PDS response patterns compatible with PTSD diagnostic criteria and only three reported posttraumatic symptoms on the PDS, which were within the "mild" (2 individuals) or "moderate" (1individual) ranges. IES-R total scores for these individuals were 10, 14 and 25.

Appendix 4x The potential use of focused contrast analysis in a further study involving three groups

A study could be conducted with a diagnosed PTSD group, a trauma exposed group with minimal symptoms, and a healthy non-trauma exposed group. According to the intrusive encoding and dual representation models, memory bias towards threat would be expected only in the PTSD group. However, according to Dual representation theory, the trauma-exposed group with minimal symptoms might show a relative memory bias against trauma material if it had sufficiently high proportions of premature inhibitors. If no such bias was detected this could be due to high proportions of individuals having successfully emotionally processed their trauma.

To maximise statistical power, data from the three groups in such a study could be analysed using focused contrast analyses. This technique involves specifying, prior to analysis, a restricted set of comparisons amongst means based on theoretical hypotheses. The approach consequently has more statistical power than unfocused ANOVAs with post hoc tests, which consider all possible comparisons and therefore increase family wise error rates (Field 2005). A first contrast could compare the PTSD group against, the control group and the trauma-exposed group with minimal symptoms. Based on predictions of dual representation theory, contrast weights of 2, -1, and -1 would be applied to respective groups. A second contrast could then examine potential differences between the trauma-exposed group with minimal symptoms and the healthy controls, applying contrast weights of 0 to the PTSD group, and 1 and -1 respectively to the other two groups.

Appendix 4y Supplementary discussion points for Major Research Paper

Memory bias in control individuals

During the course of daily activities control individuals may typically ignore trauma stimuli because they do not consider it pertinent. However, the experiment required them to focus on the trauma stimuli. This might have produced a false impression of a memory bias that may not be present in naturalistic situations. In contrast trauma survivors might be genuinely vigilant for trauma material in naturalistic situations and display genuine memory bias effects.

Balancing of passage presentation order

A strength of the study design was the balancing of passage presentation order across passage types, as there appeared to be practise effects as testing progressed.

Controls for emotional valence

Positive and negative emotional material could have been employed to control for the effects of emotional valence on memory bias. This design feature was not implemented because the study aimed to determine the feasibility and suitability of using prose passages to investigate memory bias in a trauma population. If emotional control passages were used, it would probably be necessary to present only one passage from each passage type to avoid overloading participants' immediate memory capacity. This would require a greater focus on individuals with burns that were consistent with passage content to ensure personal salience. However, it would no longer be possible to control for confounding characteristics that might be associated with specific passage content.

Chronic PTSD

The absence of a significant memory bias in the burn-injured group may have been due to the absence of burn survivors with chronic posttraumatic symptoms. Litz (1996) and Paunovic et al (2002) note that the trauma memory network may only become more generalised as symptoms become more chronic. This possibility should be further investigated.

Participants' categorisations of passages

Paunovic et al (2003) suggest a novel approach to investigations of memory bias may be warranted to take into account variance in stress and salience ratings. Recall bias could be studied by comparing recall for passages that participants categorise as least and most trauma-related rather than using artificially designated categories. This approach should be explored but it may be difficult to control for confounding factors associated with the specific content of passages.

Appendix 4z Revisions to passages and to assessment of stress and salience

Revisions to assessment of stress and salience

The salience question asked burn survivors how much passages reminded them of their own burn injuries. However, it may have been too open to interpretation. Individuals may have rated the level of similarity with their burn experience or the extent to which passages evoked emotion or caused them to think about their injury or trauma memories. Perhaps a more specific question would be more suitable such as "How much did the passage provoke thoughts, feelings or memories that you have experienced when you think about your burn injury?" This possibility should be examined further. Similarly participants rated the level of stress evoked by passages in accordance with previous studies. However, perhaps "distress" would have been more appropriate, as some individuals may have been commenting on the mental demands associated with the task rather than the emotional impact.

Revisions to passages

The constructed passages employed in this study would benefit from some revisions.

Descriptive words like "unpleasant", "frantically" and "blistering" were included to ensure readability matching between passages. However, many participants were penalised for failing to mention these words (or variants) and it is recommended that passage content be revised accordingly. Some of the wording of passages should also be adjusted to take into account common errors. For example, most individuals referred to a character "making" chips when "cooking" or "frying" were required.

Demographic details of characters at the beginning of passages should be reduced to allow individuals to focus more closely on trauma-related elements of passages. There was also some overlap in content between passages, which should be reduced to prevent intrusion errors.

Contrary to expectations, some individuals rated the second neutral passage, which described a delayed bus journey, as slightly stressful. Participants in both groups identified with the character's frustration and some burn survivors, injured in motor vehicle accidents, associated the passage with their trauma. The second passage should be modified to address these factors.